...ICAL ROOM
...RAL LIBRARY
...OF MICH.

SEP 24 1930

SEPTEMBER 1930

# Journal of Educational Research

Registered June 4, 1929

CONTENTS

How Does Your School Rate in Providing for Gifted Children? *John J. Hall* 81

A Scale for Measuring Attitude Toward the Movies *L. L. Thurstone* 89

Further Evidence Favoring the Two-Factor Theory *Clem O. Thompson* 95

Techniques Used in Securing Equivalent Groups *Max D. Engelhart* 103

Minor Studies on Objective Examination Methods *I. H. Brinkmeier* and *G. M. Ruch* 110

Student Responses in the Measurement of Reading Comprehension *Spencer Shank* 119

Shorter Articles 130

Editorials 140

Reviews 142

Research Abstracts and Bibliographies 149

Research News and Communications 153

THE JOURNAL OF EDUCATIONAL RESEARCH is indexed in the Education Index

---

Copyright 1930, by Public School Publishing Co.

Entered as second-class matter at the Post Office at Bloomington, Illinois under the act of March 3, 1879

n. There
ucational
"reading

tion still
re of the
iscovered
will not
n adults
jects, or
n best fit

program
lines of
as to do
ducation
e use of
structive
ocial re-
ion for

SEP 24 1930

SEPTEMBER 1930

# Journal of Educational Research

Registered June 4, 1929

CONTENTS

How Does Your School Rate in Providing for Gifted Children? *John J. Hall* 81

A Scale for Measuring Attitude Toward the Movies *L. L. Thurstone* 89

Further Evidence Favoring the Two-Factor Theory *Clem O. Thompson* 95

Techniques Used in Securing Equivalent Groups *Max D. Engelhart* 103

Minor Studies on Objective Examination Methods *I. H. Brinkmeier* and *G. M. Ruch* 110

Student Responses in the Measurement of Reading Comprehension *Spencer Shank* 119

Shorter Articles 130

Editorials 140

Reviews 142

Research Abstracts and Bibliographies 149

Research News and Communications 153

THE JOURNAL OF EDUCATIONAL RESEARCH is indexed in the Education Index

Copyright 1930, by Public School Publishing Co.

Entered as second-class matter at the Post Office at Bloomington, Illinois under the act of March 3, 1879

# JOURNAL OF EDUCATIONAL RESEARCH


## EDITORIAL BOARD

E. J. ASHBAUGH, *Dean, School of Education and Professor of Education, Miami University, Oxford, Ohio*

A. S. BARR, *Chairman, Editorial Board, Professor of Education, University of Wisconsin, Madison, Wisconsin*

V. T. THAYER, *Educational Director, Ethical Culture Schools, New York City*

## ASSOCIATE EDITORS

FRED C. AYER, *Professor of Educational Administration, University of Texas, Austin, Texas*

HARRY J. BAKER, *Director, Psychological Clinic, Detroit Public Schools, Detroit, Michigan*

FOWLER D. BROOKS, *Head of Departments of Education and Psychology, DePauw University, Greencastle, Indiana*

B. R. BUCKINGHAM, *Lecturer in Education, Harvard University, Cambridge, Massachusetts*

W. W. CHARTERS, *Director, Bureau of Educational Research and Professor of Education, Ohio State University, Columbus, Ohio*

VIRGIL E. DICKSON, *Assistant Superintendent of Schools and Director of Bureau of Research and Guidance, Berkeley Public Schools, Berkeley, California*

CHARLES FORDYCE, *Director, Bureau of Educational Measurements, University of Nebraska, Lincoln, Nebraska*

CARTER V. GOOD, *Professor of Education, University of Cincinnati, Cincinnati, Ohio*

WILLIAM S. GRAY, *Dean, School of Education and Professor of Education, University of Chicago, Chicago, Illinois*

CHARLES E. GREENE, *Director of Research, Denver Public Schools, Denver, Colorado*

M. E. HAGGERTY, *Dean, College of Education and Professor of Education, University of Minnesota, Minneapolis, Minnesota*

V. A. C. HENMON, *Chairman, Department of Psychology and Professor of Psychology, University of Wisconsin, Madison, Wisconsin*

KARL J. HOLZINGER, *Professor of Education, University of Chicago, Chicago, Illinois*

ERNEST HORN, *Director, University Elementary School and Professor of Education, State University of Iowa, Iowa City, Iowa*

EARL HUDELSON, *Dean, College of Education and Professor of Education, West Virginia University, Morgantown, West Virginia*

ARTHUR W. KALLOM, *First Assistant Director, Department of Educational Investigation and Measurement, Boston Public Schools, Boston, Massachusetts*

FREDERICK J. KELLY, *Lecturer in Higher Education, University of Chicago, Chicago, Illinois*

WILLIAM A. McCALL, *Professor of Education, Teachers College, Columbia University, New York City*

EUGENE A. NIFENECKER, *Director of Reference, Research, and Statistics, Board of Education, 500 Park Avenue, New York City*

W. J. OSBURN, *Director of Research, State Department of Education, and Professor of School Administration, Ohio State University, Columbus, Ohio*

SHELTON PHELPS, *Director of Instruction and Professor of Education, George Peabody College, Nashville, Tennessee*

DOUGLAS E. SCATES, *Director, Research and Statistics, Cincinnati Public Schools, Cincinnati, Ohio*

JESSE B. SEARS, *Professor of Education, Stanford University, California*

JOHN L. STENQUIST, *Director, Bureau of Educational Research, Department of Education and Lecturer, Johns Hopkins University, Baltimore, Maryland*

GEORGE D. STRAYER, *Director, Division of Field Studies, Institute of Educational Research, and Professor of Education, Teachers College, Columbia University, New York City*

PERCIVAL M. SYMONDS, *Associate Professor of Education, Teachers College, Columbia University, New York City*

W. W. THEISEN, *Assistant Superintendent of Schools, Milwaukee, Wisconsin*

M. R. TRABUE, *Director, Bureau of Educational Research, Head of Division of Elementary Education, and Professor of Educational Administration, University of North Carolina, Chapel Hill, North Carolina*

W. L. UHL, *Dean, School of Education and Professor of Education, University of Washington, Seattle, Washington*

CARLETON W. WASHBURNE, *Superintendent of Schools, Winnetka Public Schools, Winnetka, Illinois*

GUY M. WHIPPLE, *Secretary, National Society for the Study of Education, Danvers, Massachusetts*

CLIFFORD WOODY, *Director, Bureau of Educational Reference and Research and Professor of Education, University of Michigan, Ann Arbor, Michigan*


---


THE JOURNAL OF EDUCATIONAL RESEARCH is published at Bloomington, Illinois, monthly, except July and August by the Public School Publishing Company. The subscription price is $4.00; $4.20 in Canada or Mexico; and $4.50 in other foreign countries.

Subscriptions and all communications about reprints or other business matters should be addressed to the PUBLIC SCHOOL PUBLISHING COMPANY, at Bloomington, Illinois.

Address all communications on editorial matters to A. S. Barr, Department of Education, University of Wisconsin, Madison, Wisconsin.

JOURNAL *of* EDUCATIONAL RESEARCH

Volume XXII SEPTEMBER 1930 Number 2

# HOW DOES YOUR SCHOOL RATE IN PROVIDING FOR GIFTED CHILDREN?

JOHN J. HALL
*West High School, Rochester, N. Y.*

## A SCORE SHEET

PERHAPS it is not too strong to make a statement that recognition of individual differences is fully as old as the story of man. Mythology and history both indicate that the leaders of a tribe or of a state maintained their positions because of two qualities: (1) physical strength, and (2) cleverness in outwitting their opponents. Perhaps in the beginning, brute strength was more important than intelligence. Later on, intelligence became the domineering factor in successful leadership. To-day we realize that intelligence combined with physical strength is the heritage we wish to pass on to the next generation. We also realize now that we are living in a world in which no one person or thing is independent of every one else. We each have a part to perform, a duty toward society to fulfill, and the aims of education should be to help each individual to find what he is best fitted to do and then prepare him to do that thing to the best of his ability.

If we accept these aims of education, it seems as though part of our program should be to select those children who possess superior intelligence and to make it possible for them to develop along the lines of their special interests and abilities. A considerable amount of material has been published in this connection, especially during the last twenty years. Through the efforts of such men as Dr. Lewis M. Terman, Dr. Guy M. Whipple, and others, The National Society for the Study of Education, in 1924, devoted the Twenty-Third Year Book entirely to the study of "The Education of Gifted Children." This volume contains an account of what has been done for gifted children in various parts of the country. It also contains an annotated bibliography of 453 references on the subject of gifted children and their education. Dr.

Whipple who edited the Twenty-Third Year Book states in the preface that the members of the committee, who prepared this study, had not agreed upon certain fundamental principles concerning the education of gifted children. He expressed the hope that the Society would feel disposed to continue the committee and permit the publication of another yearbook on the same topic which might "include a definite program to which all members of the committee may subscribe."

It is not surprising that this situation exists at the present time. The whole question of personality and individual differences is still in the experimental state. Gradually, however, certain general principles are being formed and the prospects for an early solution of the problem are encouraging. Meanwhile many schools located in various parts of the country are earnestly engaged in studies to determine the best means of meeting their own needs. There are other schools that are fully aware of the fact that special training of bright children is desirable, but have not as yet decided just how or where to begin their program.

In view of these facts, the following score sheet is offered with the hope that it may be of service to these schools just mentioned as well as to those schools that have already made provisions for their gifted children and wish to check up on the efficiency of their plan. It should be distinctly understood that the writer regards the score sheet as being merely tentative. The ratings assigned to the various items have not been obtained by any hard and fast statistical methods. The method of determining these ratings will be explained later. It is believed that they are not very far wrong and the relative importance of each item considered is indicated by the number of credits assigned to it.

The method used in planning the score sheet was to make a careful survey of the outstanding plans now used in giving "special educational facilities for children of superior intelligence." Rather complete data were gathered and classified under the following heads:

(1) In what grades should the selection of gifted children take place?
(2) By what methods should these children be selected?
(3) In what ways may this bright group affect the organization of the regular school program?
(4) How should the curriculum be adjusted to these gifted children?
(5) In what ways should instruction of these children differ from the instruction of the regular or average children?

The next step was to arrange this material in the form of a questionnaire. This was submitted for scoring to a group of twelve judges

made up of university professors and graduate students of education. As presented here, the score sheet has been revised to conform with the criticisms and suggestions offered by the judges. The items listed on the score sheet and the credits (on a basis of 1000 for a perfect score) represent the consensus of opinion of the judges. In assigning credits for some of the minor sub-topics, the values were determined upon by conference with Dr. Sears and Dr. Terman of Stanford. In the main, however, the weighting is the result of the combined opinions of all the judges. The writer believes that the major points of the subject have been covered, and criticisms and comments are invited concerning either the items or the weights to each.

It is possible to use the score sheet in more than one way. In its present form it may be of value in determining the efficiency of a program that is already in operation, or it may be used as a guide by a school that is desirous of introducing some form of special training for its bright pupils. Moreover, by slightly changing the wording of certain items, the score sheet can be used to determine the efficiency of a school system in providing for its dull children. For example, probably no change need be made in I, II-A, B, D. In II-C, 1, the child's physical development may be so worded as to read "below normal" in height, weight, and general health; II-C, 2, the child's social age may be based upon his chums, games, and reading material as "below-age;" also his inability or disinclination to take a prominent part in extra curricula activities may indicate that he needs special training in order to bring him nearer to normal. In II-C, 3, the wording might be changed to "lack of coöperation" between parents and school. In like manner certain other changes may be made by one using the score sheet in determining the effectiveness of the provisions for less gifted children.

For the most part, the score sheet is largely self-explanatory. It might be worthwhile, however, to comment briefly on some of the items it contains. To start with, one of the first questions to be decided in planning special instruction of bright pupils is when should differentiation begin. It is felt that if full benefit of special training of gifted children is to be realized, it should begin in the first grade and continue through the twelfth. An early start permits coherence and eliminates useless repetition and consequent waste of time and energy. The idea of when to start, however, must be associated with the method to be used in differentiated training of the bright group. There are some educators who claim that this training should be accomplished by accelera-

tion of the group while others maintain that bright children should not be rushed through school but should be given an enriched course of study. Actually, there is much to be said in favor of both of these schemes, but, as is so often the case, the real solution probably lies somewhere between the issues. In-as-much as there are certain fundamental elements in education that all children should receive, such as reading, writing, and number combinations, it may be that acceleration is permissible in the first two or three grades. These are the formative years of a child's life, however, and even though it is decided that a child may skip a grade without serious loss, it seems as if some provision should be made to give him enriched material. Dr. Charles Judd has pointed out that the interval corresponding from the fourth to the sixth grade in school is the period in which the child changes from the imitative phase of his development to the individualistic stage.[1] This is borne out by a study made by Miss Davis on undesirable character traits displayed by gifted children. Her investigations led her to conclude that it was a serious mistake to permit:

"....gifted children to dally through the lower grades until their bad habits of study have become difficult to eradicate in the upper grades ....(and hence) the earlier in his school career we provide for the gifted child in the light of his superior capacities, the more successful his career will be, and the less time will be wasted in developing undesirable habits which later must be unlearned."[2]

Therefore if selection of bright children is made in the first grade, six points are allowed. If in the second, third, and fourth grades, eight points are assigned to each; grades five to nine inclusive receive ten points each; grade ten is allowed eight points, and but six points are assigned to each of the eleventh and twelfth grades. A school that provides a special program for the whole twelve grades would receive a perfect score of 100 points.

The second question that arises concerns the methods to be used in selecting the bright children. The score sheet indicates that the final selection should be made on the basis of the information that can be secured from (1) intelligence tests, (2) achievement tests, (3) child's personality, and (4) teachers' judgments. There is strong evidence to indicate that each of these four factors have a direct bearing upon the

[1] Judd, C. H. Series of lectures given in Rochester, N. Y., 1929.

[2] Davis, Helen. *Twenty-Third Yearbook*, National Society for the Study of Education, 1924.

child's success and, hence, all of them should be considered in making up this group. The score sheet indicates how the judges felt these factors should be rated. A perfect score for this item is 225.

In coming to the third topic, organization, we find that there are many questions to be answered. Some of these are: Should the bright children be segregated or should they be given individual instruction in mixed rooms? Should the gifted children be permitted to set their own pace or should they be required to work together in groups? Is grade skipping ever desirable? On what basis should the teachers of the bright groups be selected? Should there be a difference in the salary schedules for teachers of the average groups and teachers of the gifted children? Should the teachers be given much or little freedom in planning the work for the bright group? What provisions should be made for re-adjustments within the groups? Should the standards of achievement for the bright group be higher than those for the average groups? By referring to the score sheet, one will find how the judges decided that these questions should be answered. Also the number of credits allowed each item indicates their relative importance.

The number of credits assigned to the organization for a perfect score is 175.

In regard to the curriculum itself, there are three possibilities (1) acceleration, (2) enrichment, and (3) a combination of acceleration and enrichment. It is possible to secure 250 credits for this topic.

Finally the methods used in presenting the work to the pupils is rated 250 points. It is quite generally accepted that gifted children require not more than 50 percent of the drill and explanation of subject matter that the average group of children need. The resulting gain in time makes it possible to put the emphasis upon the development of those qualities or traits that are listed in the last item of the score sheet D. It will be noticed that 100 points are assigned to this item. This is explained by the fact that one of the main arguments advanced for special training of gifted children is that it fosters the development and growth of just such qualities as those listed under V-D. Moreover, this list probably corresponds closely to the list of criteria used by teachers in forming their judgments as to whether or not the child belonged to the special group. (See II-D) It is unfortunate that we are not yet able to measure these qualities more objectively, but it is felt that reasonable care in rating will overcome this defect to a considerable degree.

## A SCORE SHEET BY MEANS OF WHICH A SCHOOL SYSTEM MAY JUDGE ITS EFFICIENCY IN PROVIDING FOR BRIGHT CHILDREN

I. Grade(s) in which some form of special training is given to bright children.

| | | | | | | | | | | | | | Perfect Score | | | Your Score | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. |
| Grade in School | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | |
| Perfect Score | 6 | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 8 | 6 | 6 | ... | ... | 100 | ... | ... | ... |
| Your score | | | | | | | | | | | | | ... | ... | ... | ... | ... | |

II. Methods used in selecting bright children.

| | | | |
|---|---|---|---|
| Perfect score | | | 225 |
| A. Intelligence tests | | 65 | |
| 1. If individual tests only are used, allow | 65 | | |
| 2. If group tests only are used, allow | 40 | | |
| 3. If individual tests are used to supplement group tests where necessary, allow | 65 | | |
| B. Achievement records | | 45 | |
| Based upon: | | | |
| 1. Past performance | | | |
| a. If based upon grade marks only, allow | 15 | | |
| b. If based upon rank in class only, allow | 10 | | |
| c. If based upon both rank in class and grade marks, allow | 25 | | |
| 2. Standardized educational tests only, allow | 20 | | |
| 3. Both past performance and standardized educational tests, allow | 45 | | |
| C. Child's personality | | 65 | |
| 1. Health of child | 15 | | |
| If child is required to have good general health determined by: | | | |
| a. Thorough physical examination, allow | 15 | | |
| b. Superficial examination by physician or school nurse, allow | 3 | | |
| 2. Child's social age | 28 | | |
| a. Age of chums, if found to be at-age or above-age, allow | 7 | | |
| b. Games, if found to be at-age or above-age, allow | 7 | | |
| c. Ability of child to take a prominent part in extra-curricula activities, allow | 7 | | |
| d. Child's choice of reading matter, if found to be at-age or above-age, allow | 7 | | |
| 3. Home conditions | 22 | | |
| Based on: | | | |
| a. Coöperation between parents and school, allow | 12 | | |
| Judged by: | | | |
| (i) Discipline in the home | | | |
| (ii) Enforcement in home of a definite schedule for study | | | |
| (iii) Conditions for study in the home | | | |
| (iv) Active interest by parents in child's daily work and progress | | | |
| b. Environment favorable for the development of leaders, allow | 8 | | |
| c. Child not required to help support the family, allow | 2 | | |
| D. Teachers' judgment as to child's qualifications for special training | | 50 | |
| Based upon: | | | |
| 1. A uniform and well defined list of criteria that include both mental and social qualities of the child as judged by: | | | |
| a. Two or more teachers working independently, allow | 50 | | |
| b. One teacher's judgment only, allow | 30 | | |

| | Perfect Score | | | Your Score | | |
|---|---|---|---|---|---|---|
| | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. |
| 2. Neither a well defined nor uniform list of criteria, i.e., largely subjective opinion, allow | 5 | | | | | |
| III. Factors affecting the organization. Perfect score. | | | 175 | | | |
| A. Type of instruction of bright pupils | | 62 | | | | |
| 1. Elastic assignment, may be maximum and minimum assignment or special reports, allow | 30 | | | | | |
| 2. Individual acceleration | | | | | | |
| a. If merely grade skipping, allow | 8 | | | | | |
| b. If child is especially coached to permit grade skipping, allow | 12 | | | | | |
| 3. Individual instruction, such as Winnetka Plan, allow | 50 | | | | | |
| 4. Segregated classes | | | | | | |
| a. If taught in groups, allow | 40 | | | | | |
| b. If given individual instruction, allow. | 62 | | | | | |
| B. Teachers | | 55 | | | | |
| 1. If selection of teachers is based upon special requirements over and above those of regular teachers in training, personality, and experience, allow | 12 | | | | | |
| 2. If on a higher salary schedule than regular teachers, allow | 12 | | | | | |
| 3. If a large degree of freedom is given to the teachers in selection and presentation of subject matter, allow | 25 | | | | | |
| 4. If teachers are expected to continue with a class for at least two years, allow | 6 | | | | | |
| C. Special equipment | | 22 | | | | |
| If rooms are provided with: | | | | | | |
| 1. Movable desks and chairs, allow | 8 | | | | | |
| 2. A liberal number of reference and supplementary books, maps, and charts, allow | 10 | | | | | |
| 3. Other equipment, allow | 4 | | | | | |
| D. Flexible schedule such as will permit acceleration or retardation of pupils as soon as it is apparent that they are wrongly classified, allow | | 18 | | | | |
| E. Higher standards of achievement in force for bright pupils than for average pupils, allow | | 9 | | | | |
| F. A common list of minimum requirements for all pupils in the selected group, allow | | 9 | | | | |
| IV. Modification of the curriculum. Perfect score. | | | 250 | | | |
| A. Acceleration | | 65 | | | | |
| If it takes the form of: | | | | | | |
| 1. Omission of subject matter or if it sets up merely a list of minimum requirements, allow | 30 | | | | | |
| 2. Advanced subjects or topics brought down to the child, allow | 35 | | | | | |
| B. Enrichment of curriculum | | 185 | | | | |
| If obtained by: | | | | | | |
| 1. Intensive study of the same subjects that are usually taught in the grade, allow | 50 | | | | | |
| 2. New subjects added to the curriculum such as: projects or special topics, appreciation of literature, writing of prose or poetry, journalism, music, dancing, sculpture, painting, dramatics, clubs, debating societies, research problems, field trips, etc., allow | 135 | | | | | |
| C. A well thought out combination of both acceleration and enrichment of curriculum that takes care of every child's needs, allow | | 250 | | | | |

| | Perfect Score | | | Your Score | | |
|---|---|---|---|---|---|---|
| | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. | Items 1, 2 or a, b, etc. | Items A, B etc. | Items I, II etc. |
| V. Method of instruction. Perfect score | | | 250 | | | |
| A. If usual amount of drill is reduced by at least 50 percent for bright children, allow | | 50 | | | | |
| B. If explanation of new work is reduced by at least 50 percent for bright children, allow | | 50 | | | | |
| C. If socialized recitations are used to a considerable extent, allow | | 50 | | | | |
| D. If the emphasis is placed upon the development of such traits as the following, allow | | 100 | | | | |
| 1. Ability to generalize | | | | | | |
| 2. Self-criticism | | | | | | |
| 3. Initiative and originality | | | | | | |
| 4. Tenacity of purpose | | | | | | |
| 5. Power to assume responsibility | | | | | | |
| 6. Self-government | | | | | | |
| 7. Coöperation | | | | | | |
| 8. Self-assurance | | | | | | |
| 9. Correct habits of study | | | | | | |
| 10. Love of knowledge | | | | | | |
| 11. Tolerance and understanding of the rights of others | | | | | | |
| Total credits allowed on Part I | | | 100 | | | |
| Total credits allowed on Part II | | | 225 | | | |
| Total credits allowed on Part III | | | 175 | | | |
| Total credits allowed on Part IV | | | 250 | | | |
| Total credits allowed on Part V | | | 250 | | | |
| Total possible score | | | 1000 | | | |

Rating of school

If school receives 800—1000, it is excellent.
If school receives 600— 799, it is good.
If school receives 400— 599, it is fair.
If school receives 0— 399, it is poor.

# A SCALE FOR MEASURING ATTITUDE TOWARD THE MOVIES

L. L. THURSTONE*
*University of Chicago*

THE purpose of this paper is to present a scale for measuring attitude toward the "movies" and to describe the method of its construction. This study was undertaken as one of the projects of the Payne Fund of New York. The research program is directed by Professor W. W. Charters of Ohio State University.

The original collection of opinions about the movies consisted of two hundred and fifty-eight statements. These opinions, each of which reflects an attitude toward the movies, vary from statements decidedly in favor of the movies through neutral statements to those very much opposed to the movies. They were obtained from literature on the subject, from conversation, and from direct questioning of subjects whose education and experience varied from that of seventh grade children to that of graduate students in the University.

Each statement was then typewritten on a separate card. As a preliminary method of eliminating the most unsatisfactory and retaining the best statements, as well as to get an approximate idea of the scale values of the statements, the method of equal-appearing intervals[1] was used with a small group of sorters. Twenty-five people, who had some understanding of the method being used and who were carefully chosen to make sure that the directions would be thoroughly understood and complied with, sorted the cards into eleven piles according to the following instructions:

"These cards contain statements about the value of the movies. Please arrange these cards in eleven piles so that those expressing attitudes most strongly in favor of the movies are in pile one, those which are neutral are in pile six, and those which are most strongly against the movies are in the eleventh pile. The intermediate piles should represent equal steps in appreciation or depreciation of the movies.

"Do not try to get the same number of cards in each pile. They are not evenly distributed.

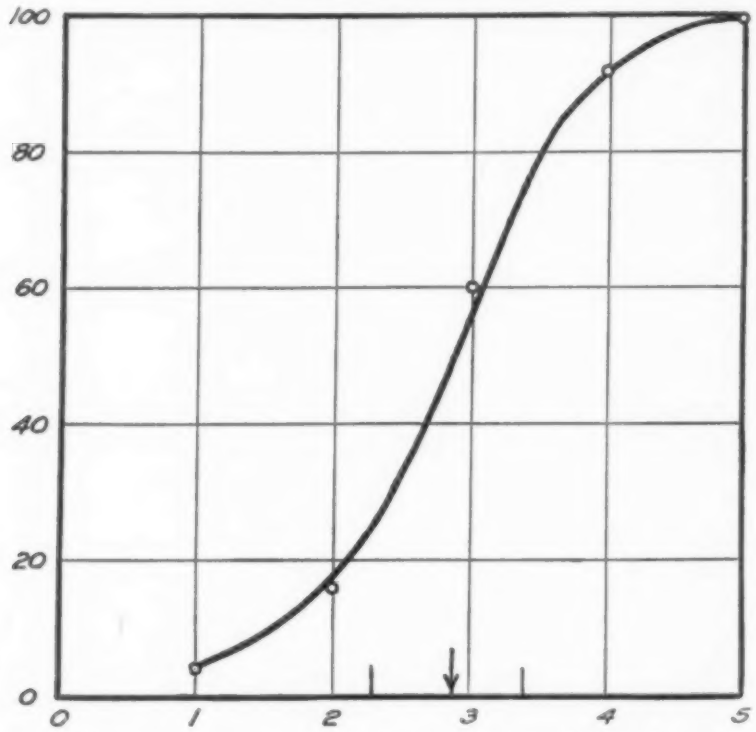
* Acknowledgment is made to Miss Ruth Peterson for assistance throughout the entire study and to Miss Marie Thiele for the collection of the original set of statements.

[1] Thurstone, L. L. "Attitudes Can Be Measured," *American Journal of Sociology*, XXXIII (Jan., 1928), pp. 529-554.

"The numbers on the cards are code numbers and have nothing to do with the arrangement in piles.

"You will find it easier to sort them if you look over a number of the slips, chosen at random, before you begin to sort."

The results of these twenty-five sortings were tabulated to show in which piles each statement was placed by the group of sorters. The scale values were then determined graphically. As an example of the method used, one of the graphs is reproduced below.




Statement Number 101, "Movies increase one's appreciation of beauty."
$Q_1 = 2.25$
$M = 2.90$
$Q_3 = 3.45$

$Q = 1.20$

The figure represents statement number 101 of the original group which happens to be retained in the final scale as Number 12. The graph shows that all the sorters classified the statement as favorable to

the movies. The statement reads "Movies increase one's appreciation of beauty." The curve crosses the 50 percent level at the value of 2.9. This scale value is such that half the readers classified it as favorable to movies and half of them as less favorable.

The scale value is indicated by the arrow head on the base line. The lighter lines on either side of the arrow head indicate the quartile range of values assigned to the statements. The Q-value in this case is 1.10. This is a measure of the ambiguity of the statement.

For the application of a more exact scaling technique one hundred statements were chosen from the two hundred and fifty-eight. The choice was based on the following criteria:

1) A continuity of scale values, i.e., a selection of approximately the same number from each region of the scale.

2) Selection of statements with small Q-values.

3) Diction and clearness of the statement itself.

The average Q-value of the statements retained was 1.18 with a range of .40 to 1.90; while the average Q-value of those statements not retained was 1.44 with a range of .50 to 3.25.

Two hundred sets of these one hundred statements were then printed on three by five cards.

The one hundred statements were then arranged in ten envelopes for rank order sortings. The first envelope contained the fifteen statements most strongly in favor of the movies as determined by the preliminary scaling method. The second envelope contained statements 8 to 22, the third envelope 18 to 32, and so on, the tenth envelope containing statements 86 to 100. Thus it is seen that fifty of the one hundred statements were repeated in two envelopes.

The statements in each envelope were in random order and the envelopes were also put in random order. The ten envelopes of statements were presented to the people who were to sort them with the following directions:

"Each envelope in this series contains fifteen cards. On each card is a statement about the movies. Some of these statements are in favor of the movies, and some of them are against the movies. Will you arrange the fifteen statements in each envelope so that the statement which is most in favor of the movies is on top, face up, and the statement which is least in favor of the movies or most strongly against the movies is on the bottom. The cards should all be arranged so that each card is more in favor of the movies than the card under it and less in favor of the movies than the card above it.

"In considering each statement ask yourself this question:

" 'How strongly in favor of the movies is a person who endorses or agrees with this statement?' Try to disregard your own attitude toward the statements.

"The identification numbers on the cards have no significance."

Two hundred people sorted the statements by the above directions, putting the fifteen statements in each envelope in rank order.

The results of these sortings were tabulated, and from the tabulations we determined the proportion of times each statement was rated as more strongly in favor of the movies than every other statement. From these proportions the scale separations of the statements in each envelope were determined from the formula[2]

$$b-a = \frac{\Sigma x_{ka} - \Sigma x_{kb}}{n}$$

in which $(b-a)$ is the scale separation between $a$ and $b$.

$x_{ka}$ is the deviation $(k-a)$ in terms of the standard deviation. It is ascertained from the probability tables by means of the observed proportions $k > a$.

$x_{kb}$ is the deviation $(k-b)$ in terms of the standard deviation.

$n$ is the number of statements minus one.

Since there were overlapping statements in each adjacent pair of envelopes, the scale separations for the whole set of one hundred statements could be calculated. The final scale values of the one hundred statements ranged from 4.74, the most strongly in favor of the movies, to 0.00, the most strongly against the movies.

The one hundred statements were then divided into ten groups, with a range of .5 scale step in each group. Subsequently four statements were selected from each group, arriving at a final attitude scale consisting of forty statements approximately evenly spaced on the scale. The complete scale is given below, and the scale value of each statement is shown in parentheses following its serial number. The statements have been arranged in random order.

ATTITUDE TOWARD MOVIES

This is a study of attitudes toward the movies. On the following pages you will find a number of statements expressing different attitudes toward the movies.

[2] "Method of Paired Comparisons for Social Values" (equation 5, p. 391), *Journal of Abnormal and Social Psychology, XXI* (Jan.-March, 1926), pp. 384-400.

√ Put a check mark if you agree with the statement.

× Put a cross if you disagree with the statement.

If you simply cannot decide about a statement you may mark it with a question mark.

This is not an examination. There are no right or wrong answers to these statements. This is simply a study of people's attitudes toward the movies. Please indicate your own attitude by a check mark when you agree and by a cross when you disagree.

LIST OF OPINIONS IN THE SCALE

1. (1.5) The movies occupy time that should be spent in more wholesome recreation.
2. (1.3) I am tired of the movies; I have seen too many poor ones.
3. (4.5) The movies are the best civilizing device ever developed.
4. (0.2) Movies are the most important cause of crime.
5. (2.7) Movies are all right but a few of them give the rest a bad name.
6. (2.6) I like to see movies once in a while but they do disappoint you sometimes.
7. (2.9) I think the movies are fairly interesting.
8. (2.7) Movies are just a harmless pastime.
9. (1.7) The movies to me are just a way to kill time.
10. (4.0) The influence of the movies is decidedly for good.
11. (3.9) The movies are good, clean entertainment.
12. (3.9) Movies increase one's appreciation of beauty.
13. (1.7) I'd never miss the movies if we didn't have them.
14. (2.4) Sometimes I feel that the movies are desirable and sometimes I doubt it.
15. (0.0) It is a sin to go to the movies.
16. (4.3) There would be very little progress without the movies.
17. (4.3) The movies are the most vital form of art to-day.
18. (3.6) A movie is the best entertainment that can be obtained cheaply.
19. (3.4) A movie once in a while is a good thing for everybody.
20. (3.4) The movies are one of the few things I can enjoy by myself.
21. (1.3) Going to the movies is a foolish way to spend your money.
22. (1.1) Moving pictures bore me.
23. (0.6) As they now exist movies are wholly bad for children.

24. (0.6) Such a pernicious influence as the movies is bound to weaken the moral fibre of those who attend.
25. (0.3) As a protest against movies we should pledge ourselves never to attend them.
26. (0.1) The movies are the most important single influence for evil.
27. (4.7) The movies are the most powerful influence for good in American life.
28. (2.3) I would go to the movies more often if I were sure of finding something good.
29. (4.1) If I had my choice of anything I wanted to do, I would go to the movies.
30. (2.2) The pleasure people get from the movies just about balances the harm they do.
31. (2.0) I don't find much that is educational in the current films.
32. (1.9) The information that you obtain from the movies is of little value.
33. (1.0) Movies are a bad habit.
34. (3.3) I like the movies as they are because I go to be entertained, not educated.
35. (3.1) On the whole the movies are pretty decent.
36. (0.8) The movies are undermining respect for authority.
37. (2.7) I like to see other people enjoy the movies whether I enjoy them myself or not.
38. (0.3) The movies are to blame for the prevalence of sex offences.
39. (4.4) The movie is one of the great educational institutions for common people.
40. (0.8) Young people are learning to smoke, drink, and pet from the movies.

In scoring the attitude scale we cannot say that one score is better or worse than another; we can only say that one person's attitude toward the movies is more or less favorable than another person's. It is purely arbitrary that attitudes unfavorable to the movies have lower scale values than favorable attitudes.

Any individual's attitude is measured by the average or mean scale value of all the statements he checks. The person who has the larger score is more favorably inclined toward the movies than the person with a lower score.

For the purpose of comparing groups, the distributions of attitude in each group can be plotted and it can then be said whether and how much one group is more favorable to the movies than another group.

# FURTHER EVIDENCE FAVORING THE TWO-FACTOR THEORY

CLEM O. THOMPSON
*Ball State Teachers College*

THE purpose of this paper is to set forth the findings of the writer, which resulted from an examination, of some data to determine to what extent these findings illustrate the two-factor theory of Professor Spearman.

The data are found in Table XLVIII of Professor Kelley's book.[1] The correlations were secured from Mr. H. G. Stead's "Factors in Mental and Scholastic Ability." The names of the tests and the correlations, as reported, are given below.

THE TESTS

1. Completion Test
2. Opposites Test
3. Instructions Test
4. Number Series Test
5. Synonyms Test
6. Cipher Test
7. Absurdities Test
8. Analogies Test

THE CORRELATIONS

| | | | |
|---|---|---|---|
| $r_{12} = .58$ | $r_{23} = .47$ | $r_{35} = .48$ | $r_{48} = .40$ |
| $r_{13} = .58$ | $r_{24} = .50$ | $r_{36} = .41$ | $r_{56} = .33$ |
| $r_{14} = .51$ | $r_{25} = .53$ | $r_{37} = .45$ | $r_{57} = .41$ |
| $r_{15} = .48$ | $r_{26} = .40$ | $r_{38} = .38$ | $r_{58} = .39$ |
| $r_{16} = .43$ | $r_{27} = .44$ | $r_{45} = .34$ | $r_{67} = .41$ |
| $r_{17} = .43$ | $r_{28} = .45$ | $r_{46} = .50$ | $r_{68} = .33$ |
| $r_{18} = .46$ | $r_{34} = .51$ | $r_{47} = .35$ | $r_{78} = .31$ |

Speaking of Mr. Stead's work, Professor Kelley says:[2]

"Mr. Stead used four different types of measures: motor tests, character tests, scholastic tests, and psychological tests, only the last of which is examined here. The character measures are not sufficiently objective for our purposes, and the motor and scholastic tests yield such low intercorrelations as to suggest low reliability; in fact the psychological tests are none too promising."

It is not perfectly clear what is meant by "none too promising." An analysis of these correlations is very promising in terms of the

[1] Kelley, Truman L. *Crossroads in the Mind of Man* (Stanford University, California: Stanford University Press, 1928), p. 209.

[2] *Ibid.*, p. 207.

two-factor theory. In fact, these data support the theory as well as any data reported from Professor Spearman's own laboratory.

The criterion, set up by Professor Spearman as a test to determine whether any ability in a given set can be divided into two factors $g$ and $s$, is the tetrad equation.

TABLE I

CORRELATION TABLE OF THE CORRELATIONS OF TESTS 1, 2, 3, AND 4

| Tests | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | .58 | .58 | .51 |
| 2 | .58 | | .47 | .50 |
| 3 | .58 | .47 | | .51 |
| 4 | .51 | .50 | .51 | |

A tetrad consists of any four coefficients of correlation which, arranged in such a table as the above, form a rectangle. Each such tetrad supplies a tetrad difference, that is, the *difference* between the product of the top left value with the bottom right value and the *product* of the top right

| | 2 | 3 | | 2 | 4 | | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| 1. | .58 | .58 | 1. | .58 | .51 | 1. | .58 | .51 |
| 4. | .50 | .51 | 3. | .47 | .51 | 2. | .47 | .50 |
| | 1 | 4 | | 1 | 3 | | 1 | 2 |
| 2. | .58 | .50 | 2. | .58 | .47 | 3. | .58 | .47 |
| 3. | .58 | .51 | 4. | .51 | .51 | 4. | .51 | .50 |

with the bottom left value. Following are the tetrads and the tetrad differences which may be secured from the above.

The latter three are identical with the first three, so for each four variables there are three tetrads and three tetrad differences. For the above, they are:

$$.58 \times .51 - .58 \times .50 = .0058$$
$$.58 \times .51 - .51 \times .47 = .0561$$
$$.58 \times .50 - .51 \times .47 = .0513$$

The formulas for the above are:

$$t_{1234} = r_{12}\, r_{34} - r_{13}\, r_{24}$$
$$t_{1243} = r_{12}\, r_{34} - r_{14}\, r_{23}$$
$$t_{1342} = r_{13}\, r_{24} - r_{14}\, r_{23}$$

The eight tests furnish 28 different correlations, ${}_8C_2$. From these twenty-eight correlations seventy sets of four variables each are derived, ${}_8C_4$. Since there are three tetrads for every set of four variables, there are 210 tetrad differences in all. These are given in Table II together with the products. The types are also indicated. There are three types of tetrad differences: ‡ = all three differences are 0; $ = two differences are equal but not 0, one is 0; * = no differences are equal.

The two criteria, formerly applied to a table of correlations to determine whether a mental ability was divisible into the two factors, *g* and *s*, were those of hierarchical order and the correlations between the columns. The later criterion, devised by Professor Spearman, is for basing the determinations upon the tetrad differences (Table II).

TABLE II

VARIABLES, PRODUCTS, TETRAD DIFFERENCES, AND TYPES

| Variables | r ab . cd | r ac . bd | r ad . be | t abcd | t abde | t acdb | Types |
|---|---|---|---|---|---|---|---|
| 1234 | .2958 | .2900 | .2397 | .0058 | .0561 | .0503 | $ |
| 1235 | .2784 | .3074 | .2256 | —.0290 | .0528 | .0818 | * |
| 1236 | .2378 | .2320 | .2021 | .0058 | .0357 | .0299 | $ |
| 1237 | .2610 | .2552 | .2021 | .0058 | .0589 | .0531 | $ |
| 1238 | .2204 | .2610 | .2162 | —.0406 | .0042 | .0448 | $ |
| 1245 | .1972 | .2703 | .2400 | —.0731 | —.0428 | .0303 | * |
| 1246 | .2900 | .2040 | .2150 | .0860 | .0750 | —.0110 | $ |
| 1247 | .2030 | .2244 | .2150 | —.0214 | —.0120 | .0094 | ‡ |
| 1248 | .2320 | .2295 | .2300 | .0025 | .0020 | —.0005 | ‡ |
| 1256 | .1914 | .1920 | .2279 | —.0006 | —.0365 | —.0359 | $ |
| 1257 | .2378 | .2112 | .2279 | .0266 | .0099 | —.0167 | ‡ |
| 1258 | .2262 | .2160 | .2438 | .0102 | —.0176 | —.0278 | ‡ |
| 1267 | .2378 | .1892 | .1720 | .0486 | .0658 | .0172 | * |
| 1268 | .1914 | .1935 | .1840 | —.0021 | .0074 | .0095 | ‡ |
| 1278 | .1798 | .1935 | .2024 | —.0137 | —.0226 | —.0089 | ‡ |

| Variables | r ab . cd | r ac . bd | r ad . bc | t abcd | t abde | t acdb | Types |
|---|---|---|---|---|---|---|---|
| 1345 | .1972 | .2448 | .2448 | —.0476 | —.0476 | .0000 | § |
| 1346 | .2900 | .2091 | .2193 | .0809 | .0707 | —.0102 | § |
| 1347 | .2030 | .2295 | .2193 | —.0265 | —.0163 | .0102 | ‡ |
| 1348 | .2320 | .1938 | .2346 | .0382 | —.0026 | —.0408 | § |
| 1356 | .1914 | .1968 | .2064 | —.0054 | —.0150 | —.0096 | ‡ |
| 1357 | .2378 | .2160 | .2064 | .0218 | .0314 | .0096 | ‡ |
| 1358 | .2262 | .1824 | .2208 | .0438 | .0054 | —.0384 | § |
| 1367 | .2378 | .1935 | .1763 | .0443 | .0615 | .0172 | * |
| 1368 | .1914 | .1634 | .1886 | .0280 | .0028 | —.0252 | ‡ |
| 1378 | .1798 | .1634 | .2070 | .0164 | —.0272 | —.0436 | * |
| 1456 | .1683 | .2400 | .1462 | —.0717 | .0221 | .0938 | § |
| 1457 | .2091 | .1680 | .1462 | .0411 | .0629 | .0218 | * |
| 1458 | .1989 | .1920 | .1564 | .0069 | .0425 | .0356 | § |
| 1467 | .2091 | .1505 | .2150 | .0586 | —.0059 | —.0645 | § |
| 1468 | .1683 | .1720 | .2300 | —.0037 | —.0617 | —.0580 | § |
| 1478 | .1581 | .1720 | .1610 | —.0139 | —.0029 | .0110 | ‡ |
| 1567 | .1968 | .1763 | .1419 | .0205 | .0549 | .0344 | § |
| 1568 | .1584 | .1677 | .1518 | —.0093 | .0066 | .0159 | ‡ |
| 1578 | .1488 | .1677 | .1886 | —.0189 | —.0398 | —.0209 | ‡ |
| 1678 | .1333 | .1419 | .1886 | —.0086 | —.0553 | —.0467 | § |
| 2345 | .1598 | .2400 | .2703 | —.0802 | —.1105 | —.0303 | § |
| 2346 | .2350 | .2050 | .2040 | .0300 | .0310 | .0010 | § |
| 2347 | .1645 | .2250 | .2244 | —.0605 | —.0599 | .0006 | § |
| 2348 | .1880 | .1900 | .2295 | —.0020 | —.0415 | —.0395 | § |
| 2356 | .1551 | .2173 | .1920 | —.0622 | —.0369 | .0253 | * |
| 2357 | .1927 | .2385 | .2112 | —.0458 | —.0185 | .0273 | * |
| 2358 | .1833 | .2014 | .2160 | —.0181 | —.0327 | —.0146 | ‡ |
| 2367 | .1927 | .1800 | .1804 | .0127 | .0123 | —.0004 | ‡ |
| 2368 | .1551 | .1520 | .1845 | .0031 | —.0294 | —.0325 | § |
| 2378 | .1457 | .1672 | .2025 | —.0215 | —.0568 | —.0353 | § |
| 2456 | .1650 | .2650 | .1360 | —.1000 | .0290 | .1290 | § |
| 2457 | .2050 | .1855 | .1496 | .0195 | .0554 | .0359 | § |
| 2458 | .1950 | .2120 | .1530 | —.0170 | .0420 | .0590 | § |
| 2467 | .2050 | .1400 | .2200 | .0650 | —.0150 | —.0800 | § |
| 2468 | .1650 | .1600 | .2250 | .0050 | —.0600 | —.0650 | § |
| 2478 | .1550 | .1760 | .1575 | —.0210 | —.0025 | .0185 | ‡ |
| 2567 | .2173 | .1640 | .1452 | .0533 | .0721 | .0188 | * |
| 2568 | .1749 | .1560 | .1485 | .0189 | .0264 | .0075 | ‡ |
| 2578 | .1643 | .1716 | .1845 | —.0073 | —.0202 | —.0129 | ‡ |
| 2678 | .1240 | .1452 | .1845 | —.0212 | —.0605 | —.0393 | * |
| 3456 | .1683 | .2400 | .1394 | —.0717 | .0289 | .1006 | * |
| 3457 | .2091 | .1680 | .1530 | .0411 | .0561 | .0150 | § |
| 3458 | .1989 | .1920 | .1292 | .0069 | .0697 | .0628 | § |
| 3467 | .2091 | .1435 | .2250 | .0656 | —.0159 | —.0815 | § |
| 3468 | .1683 | .1640 | .1900 | .0043 | —.0217 | —.0260 | ‡ |
| 3478 | .1581 | .1800 | .1330 | —.0219 | .0251 | .0470 | * |
| 3567 | .1968 | .1681 | .1485 | .0287 | .0483 | .0196 | * |
| 3568 | .1584 | .1599 | .1254 | —.0015 | .0330 | .0345 | § |
| 3578 | .1488 | .1755 | .1558 | —.0267 | —.0070 | .0197 | ‡ |
| 3678 | .1271 | .1485 | .1558 | —.0214 | —.0287 | —.0073 | ‡ |
| 4567 | .1394 | .2050 | .1155 | —.0656 | .0239 | .0895 | § |
| 4568 | .1122 | .1950 | .1320 | —.0828 | —.0189 | .0630 | § |
| 4578 | .1054 | .1365 | .1640 | —.0311 | —.0586 | —.0275 | * |
| 4678 | .1550 | .1155 | .1640 | .0395 | —.0090 | —.0485 | § |
| 5678 | .1023 | .1353 | .1599 | —.0330 | —.0576 | —.0246 | * |

Key: ‡ = all three differences are 0; § = two differences are equal but not 0, one is 0; * = no differences are equal.

An examination of Table II shows that a number of tetrad differences are larger than zero. But this is to be expected. The manifestations of

all laws, mental as well as physical, are bound to be affected by various influences. If the observations agreed absolutely with theory, it would be cause for question. "This condition holds only for 'true' correlations."[3] The problem here is to determine *how much* the differences vary from theory. The probable error of the tetrad differences was found by the formula derived by Professors Spearman and Holzinger, Formula (16a).[4] It was found to be .029. Only six tetrad differences are larger than three times the probable error and only one is more than four times. It is 4.4 times P.E. Compared with a theortical distribution, it is almost as good as can ever be expected. In Table III are given the probabilities of the deviations and the observed deviations beyond $\pm$ 2 P.E.

TABLE III

THEORETICAL AND OBSERVED OCCURRENCES BEYOND 2 P.E.

| $\frac{x}{\text{P.E.}}$ | Probability of a Deviation Beyond $\frac{x}{\text{P.E.}}$ | Observed Deviations Beyond $\frac{x}{\text{P.E.}}$ |
|---|---|---|
| 2.0 | .1773 | .1239 |
| 2.5 | .0918 | .0429 |
| 3.0 | .0430 | .0190 |
| 3.5 | .0182 | .0048 |
| 4.0 | .0070 | .0048 |

As Professor Spearman says,[5] "The reader may be reminded that an experimental value should be at least three times larger than its probable error before it can be taken even as suggestive, and it must be five times greater before its evidence can be deemed conclusive."

Some writers, however, have raised an objection to the formula which was used. By using the formula (16),[6] which is applied to the individual tetrad differences, the average probable error of eleven individual differences was found to be .029, equal to the probable error calculated according to formula (16a). The individual tetrad differences used were the six largest and the two smallest, and also, three near the center of the distribution.

The theoretical and observed distributions were then plotted. They were first plotted, taking into account the signs of the tetrad differences, with the group interval .01, and then with the group interval .02. When

[3] Spearman, C. *Abilities of Man* (New York: The Macmillan Co., 1927), p. 140.
[4] *Ibid.*, p. xi.
[5] *Ibid.*, p. 295.
[6] Spearman. *op. cit.*, p. xi.

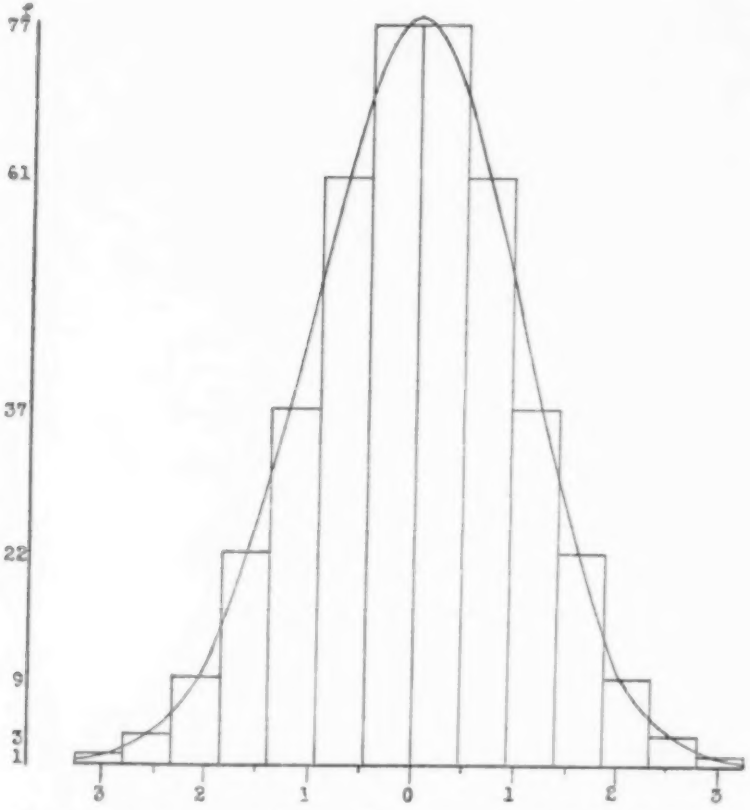



FIG. 1.—DISTRIBUTION OF TETRAD DIFFERENCES FOR THE CORRELATIONS OF KELLEY

The theoretical distribution (required for the divisibility into *g* and *s*) is given in the curve. The distribution actually observed is given in the rectangular columns. In either case, horizontal position indicates the magnitude of the tetrad difference, while height indicates its relative frequency. The tetrad differences were plotted disregarding the signs and the other half mirrored. Group interval .02. S.D. .043.

the chi square test was applied P equaled .993 in the first, and .991 in the second. The same data were then plotted, disregarding the signs, with the intervals of .01 and .02. This was done because there are twice the number of tetrad differences as given in Table II, one positive for each negative, and one negative for each positive. One side was plotted and the other side mirrored. The chi square test, when applied, gave P .886 when the interval was .01, and 1— when the interval was .02.

Figure I shows the theoretical and observed distributions, disregarding the signs, with the group interval .02.

One apparent limitation to the doctrine is the overlap between specific factors. This has been stated by some as a group factor, and by others as a bond between tests. "Obviously," says Professor Spearman,[7] "the specific factors for any two performances can only be independent of each other when these performances are quite alike. When, on the contrary, two performances are much alike, their respective specific factors will necessarily cease to be mutually independent." The performances are "quite different" *only* if the tetrad equation is satisfied.

Professor Kelley points out that there is a bond between Tests 6 and 4, one between Tests 6 and 7, and one between Tests 2 and 5.

There are only forty-one tetrad differences larger than two times the probable error. Of these forty-one, twenty seem to be due to Tests 4 and 6, seven to Tests 6 and 7, five to Tests 2 and 5, two to 3 and 7, two to 3 and 5, two to 5 and 7, one to 2 and 7, one to 5 and 8, and one to Tests 4 and 8. Table IV gives the tests responsible for the overlap, the frequencies, and the times each difference is of the group probable error.

TABLE IV

TESTS RESPONSIBLE FOR THE OVERLAP, FREQUENCIES, AND TIMES EACH DIFFERENCE IS OF P.E.

| Tests | F | Times Each Difference Is of P.E. |
|---|---|---|
| 4, 6 | 20 | 2.06 — 2.12 — 2.17 — 2.22 — 2.24 — 2.26 — 2.43 — 2.47<br>2.47 — 2.58 — 2.75 — 2.78 — 2.81 — 2.85 — 2.96 — 3.06<br>3.23 — 3.45 — 3.46 — 4.4 |
| 6, 7 | 7 | 2.02 — 2.08 — 2.12 — 2.24 — 2.26 — 2.26 — 2.48 |
| 2, 5 | 5 | 2.03 — 2.12 — 2.14 — 2.52 — 3.81 |
| 3, 7 | 2 | 2.03 — 2.08 |
| 3, 5 | 2 | 2.16 — 2.76 |
| 5, 7 | 2 | 2.02 — 2.16 |
| 2, 7 | 1 | 2.06 |
| 5, 8 | 1 | 2.4 |
| 4, 8 | 1 | 2.0 |

Of the twenty differences due to Tests 4 and 6, only five are more than three times the probable error and only one difference due to Tests 2 and 5 is more than three times. The remaining thirty-five differences are not even suggestive. This means that a group factor may be "suggested" between Tests 4 and 6 and one between Tests 2 and 5.

If we examine the individual probable errors which were calculated for the six largest differences, using formula (16), we find that the probable errors in four cases are smaller than the probable errors of the group. Stated differently, the results secured from dividing the tetrad

[7] *Ibid.*, p. 80.

differences by their individual probable errors is greater in four instances and less in two than when the differences were divided by the probable errors of the group. These facts are shown in Table V.

TABLE V

THE SIX LARGEST TETRAD DIFFERENCES DIVIDED BY THEIR INDIVIDUAL PROBABLE ERRORS

| Tetrad Differences | Individual P.E. | Difference / Group P.E. | Difference / Individual P.E. |
|---|---|---|---|
| .1290 | .023 | 4.40 | 5.60 |
| —.1105 | .035 | 3.81 | 3.16 |
| .1006 | .024 | 3.46 | 4.19 |
| —.1000 | .035 | 3.45 | 2.86 |
| .0938 | .025 | 3.23 | 3.71 |
| .0895 | .025 | 3.06 | 3.58 |

But even now, only five are more than three times their probable errors, hence only suggestive, and only one is more than five times. One out of 210 larger than five times its probable error is scarcely more than could be expected from mere chance.

The probable errors of the above six tetrad differences were also found by using Professor Kelley's formula (28),[8] with the following results: the P.E. of .1290 was .024, of —.1105 it was .022, of .1006 it was .027, of —.1000 it was .040, of .0938 it was .028, and of .0895 it was .023. Only in one instance, that of —.1105, does the P.E., according to this formula, differ appreciably from what it was found to be when the Spearman and Holzinger formula (16) was used.

In conclusion, it might be said that these data support the two-factor theory beyond any doubt and that, if a group factor is present, it is insignificant insofar as it upsets the doctrine.

[8] Spearman. *op. cit.*, p. 49.

# TECHNIQUES USED IN SECURING EQUIVALENT GROUPS

MAX D. ENGELHART
*University of Illinois*

IN precise educational experimentation the evaluation of the effect of the experimental factor is dependent on the difference between the mean gains in achievement of the experimental and the control group, which may be observed at the close of the experiment. If this difference is to be ascribed to the operation of the experimental factor, it is evident that the groups selected should be as nearly equivalent at the start of the experiment as possible. In other words, the two groups should be so nearly alike that the experimental factor may be applied to either one, and still the same difference obtained. In order to secure this identity of initial status, or "equivalence" as it is technically known, a number of different techniques have been employed. It is the purpose of this paper to discuss and illustrate these techniques.

If the experimental and the control groups are large and are selected in a purely random manner from the same general population, it is justifiable to assume that, as groups, they have the same initial status relative to the experimental factor. This means that the two groups will have the same mean intelligence, chronological age, previous achievement, physical condition, home conditions, and so on, merely as a result of chance. An investigation recently reported by Monroe illustrates the use of this technique. Four tests "were arranged in alternate order so that when distributed to the pupils in a class, the first, fifth, ninth, thirteenth, and so on, would get Test A; the second, sixth, tenth, fourteenth, and so on, would receive Test B; the third, seventh, eleventh, fifteenth, and so forth, would receive Test C; the fourth, eighth, twelfth, sixteenth, and so forth, would receive Test D."[1] Since each of the four groups was composed of approximately 2300 pupils, represented equally in each classroom, and was selected in a purely random manner, it would seem that the investigator was justified in the assumption that he had equivalent groups. Hence this technique for securing equivalent groups is to be especially noted and commended. It should be noted, however, that it is applicable in only certain types of investigations.

[1] Monroe, W. S. "How Pupils Solve Problems in Arithmetic," *University of Illinois Bulletin*, XXVI, No. 23. Bureau of Educational Research Bulletin No. 44 (Urbana: University of Illinois, 1929), p. 9.

In many cases it is necessary to utilize ordinary school classes as experimental and control groups in order to get the experiment started. When this is done, it is necessary to measure each of the groups and to make allowances later for any differences which are present. This was the procedure employed by Odell in his experiment to determine the value of intelligence tests as a basis of school organization and instruction. Four experimental and four control schools were selected on the basis of judgment at the start of the experiment. Data secured later in regard to intelligence, achievement, and health of the pupils revealed that the differences existing between the experimental and the control schools at the beginning of the experiment "were, on the whole, large enough not to be neglected as due to chance or as of no consequence, but were not large enough to invalidate the use of the two groups of schools in this experiment."[2]

Melby and Lien[3] describe and advocate a somewhat similar technique. Their plan involves the use of three or more ordinary school classes without modification. An intelligence test and appropriate achievement tests are administered to determine the initial status of these classes. The experimental factor is then applied to the class whose initial status, as shown by these measurements, is superior to some of the classes but inferior to the others. Then if the achievement of this class, because of the application of the experimental factor, surpasses that of the class or classes whose initial ability was greater, it is justifiable to claim superiority for the experimental factor; but if the achievement drops below that of the class or classes whose initial ability was lower, then the inferiority of the experimental factor is shown. The techniques used by Odell and by Melby and Lien do not secure equivalence in the sense that differences are obliterated, but they are to be commended for the absence of procedures that might disturb the usual classroom conditions.

The assumption has been made by numerous investigators that equality of the means of the group with reference to measures of general intelligence indicates adequate equivalence. Other experimenters have held that equivalence is secured when the mean mental age and the mean

---

[2] Odell, C. W. "The Use of Intelligence Tests as a Basis of School Organization and Instruction," *University of Illinois Bulletin*, XX, No. 17. Bureau of Educational Research Bulletin, No. 12 (Urbana: University of Illinois, 1922), p. 25.

[3] Melby, E. O., and Lien, A. "A Practicable Technique for Determining the Relative Effectiveness of Different Methods of Teaching," *Journal of Educational Research*, XIX (April, 1929), pp. 255-59.

chronological age are the same for different groups, and still others have urged that the two groups should also exhibit the same variability in the traits measured. Kiebler and Woody considered their groups to be equivalent when the average Army Alpha test score for one group was approximately equal to that of the other. The only reference to variability is the statement that, "Each group contained good, average, and poor students....."[4] It is felt that this technique is not as desirable as that of Brooks[5] who employed three experimental groups, each of which was approximately equal in the mean and variability of mental age and chronological age.

Some experimenters have considered it desirable to pair off students so that for each pupil in the experimental group there will be a mate in the control group who has the same mental age or intelligence test score. The fact that each individual member of an experimental group has his mate in a control group makes it possible to claim a greater degree of equivalence so far as the groups are concerned than would otherwise be possible. For example, Anibel[6] selected the groups used in his experiment on lecture-demonstration versus the individual laboratory method by pairing students whose scores were approximately equal on both the Army Alpha Intelligence Test and on the Otis Group Intelligence Scale. In making this selection some pupils were shifted from one group to the other until the mean of the Army Alpha scores of the experimental group was very nearly equal to the mean of the Army Alpha scores of the control group, and until the mean of the Otis scores of the experimental group was very nearly equal to the mean of the Otis scores of the control group.

Somewhat the same method of securing equivalence was used by Ullrich[7] in his investigation of the effect of required themes on learning. Students were selected for one group whose intelligence test scores could

[4] Kiebler, E. W., and Woody, C. "The Individual Laboratory Versus the Demonstration Method of Teaching Physics," *Journal of Educational Research*, VII (January, 1923), pp. 51-52.

[5] Brooks, F. D. "The Transfer of Training in Relation to Intelligence," *Journal of Educational Psychology*, XV (September, 1924), p. 415.

[6] Anibel, F. G. "Comparative Effectiveness of the Lecture-Demonstration and Individual Laboratory Method," *Journal of Educational Research*, XIII (May, 1926), p. 356.

[7] Ullrich, O. A. "The Effect of Required Themes on Learning," *Journal of Educational Research*, XIV (November, 1926), p. 296.

be paired within a range of two points with the intelligence test scores of the students in the other group.

Another method of securing equivalence, and one which has been used by some experimenters, is that of selecting groups which are equal in ability or aptitude, for the specific activity which is to be the response to the experimental factor. For example, if the experimental factor is a unique technique of teaching addition, the initial ability of the children for addition may be determined by an addition test and the children sorted into groups on that basis. In some cases it may happen that an experimenter will start the experimental learning with groups of zero ability in the experimental trait.

Tidyman and Johnson[8] assumed two groups to be approximately equivalent because, as groups, they spelled correctly an equal number of words in the initial spelling test. West[9] used a somewhat similar technique in his experiment on improving handwriting through diagnosis and remedial treatment. All the children were asked to write the "Gettysburg Address" for two minutes. These samples were evaluated by means of the Ayres Scale, and the experimental and control groups were shown to be approximately equivalent on the average in rate and quality. An experiment has been reported by Reeder[10] in which the pupils were considered equivalent because of the fact that the pupils had had no previous acquaintance with the textbook studied during the experiment.

As in the case of securing equivalence on the basis of measures of general intelligence, some experimenters have considered it desirable to pair off students on the basis of their scores on an initial achievement test. This more refined technique is illustrated by an experiment of Burks and Stone. In describing their procedure they state, "The pupils in the upper fourth grade, the lower fifth grade, and the upper fifth grade in each of the eight schools were given the paragraph-meaning test of the Stanford Achievement Test a few weeks after the opening of school

---

[8] Tidyman, W. F., and Johnson, E. "Value of Grouping Words According to Similar Difficulties in Spelling," *Journal of Educational Research*, X (November, 1924), pp. 297-301.

[9] West, P. V. "Improving Handwriting Through Diagnosis and Remedial Treatment," *Journal of Educational Research*, XIV (October, 1926), p. 188.

[10] Reeder, E. H. "A Method of Directing Children's Study of Geography," *Teachers College, Columbia University Contributions to Education*, No. 193 (New York: Teachers College, Columbia University, 1925), p. 33.

in the autumn. . . . . The forty C pupils were divided into two equal groups by pairing the pupils on the basis of their reading ages and chronological ages."[11]

In order to obtain more adequate equivalence with respect to the experimental factor, it has been considered desirable by several investigators to have an identity among the different groups on the basis of several criteria. The two examples which are given first illustrate equivalence secured in this way with respect to means, or means and standard deviations of the groups. Gates and Taylor[12] considered their groups equivalent because the mean speed of tapping, chronological age, mental age, I Q, and scores on a number of motor tests were approximately the same. Coryell[13] secured equivalence of her groups with respect to the means and standard deviations of such criterion measures as previous term's rating in English, Terman score, intelligence quotient, reading age, reading quotient, and composite score.

Four examples of pairing on the basis of several criteria may be given. Butterweck[14] selected pupils for his three groups on the basis of measures of intelligence and studiousness so that each individual in each of the groups was equivalent to an individual in the other groups. The location of sets of pupils on the basis of the two criteria was simplified by the use of a correlation graph. Three dots falling close together on the graph would indicate a set of three students approximately equivalent in both traits. Barton[15] has reported an experiment in which pupils in both groups were paired as well as possible on the basis of chronological age and intelligence quotient, and in which steps were taken to see that there were approximately equal numbers of both sexes in the groups. In another experiment by Gates and Taylor we find them using an elaborate

[11] Burks, J. D., and Stone, C. R. "Relative Effectiveness of Two Different Plans of Training in Silent Reading," *Elementary School Journal*, XXIX (February, 1929), p. 433.

[12] Gates, A. I., and Taylor, G. A. "An Experimental Study of the Nature of Improvement Resulting from Practice in a Motor Function," *Journal of Educational Psychology*, XVII (April, 1926), pp. 228-230.

[13] Coryell, N. G. "An Evaluation of Extensive and Intensive Teaching of Literature," *Teachers College, Columbia University Contributions to Education*, No. 275 (New York: Teachers College, Columbia University, 1927), p. 6.

[14] Butterweck, J. S. "The Problem of Teaching High-School Pupils How to Study," *Teachers College, Columbia University Contributions to Education*, No. 237 (New York: Teachers College, Columbia University, 1926), p. 16.

[15] Barton, W. A., Jr. "The Effect of Group Activity and Individual Effort in Developing Ability to Solve Problems in First Year Algebra," *Educational Administration and Supervision*, XII (November, 1926), p. 512.

technique for securing equivalence—that of matching pupils on the basis of many criteria. Butterweck, Barton, and Douglass as indicated above, paired students on the basis of more than one criterion, but Gates and Taylor[16] did theirs on the basis of *twelve*. From a large population of children, two groups were selected by pairing each child in one group with a child in the other as nearly as possible with respect to the following traits: sex, chronological age, mental age as shown by the Stanford-Binet test, intelligence quotient, scholastic maturity as judged by teachers, memory for digits presented orally, memory for letters, series presented orally, memory for series of unrelated words presented orally, memory for series of related words presented orally, memory for series of ten geometrical figures, memory for seven pictures, and memory for picture names.

The pairing of pupils on the basis of more than two criteria presents difficulty since it is hard to locate pairs of pupils which are approximately the same with respect to several traits. Douglass[17] has used a technique which may prove effective in eliminating, or reducing, this difficulty. Instead of seeking to pair on the basis of obtained scores with respect to measures of several traits, Douglass reduced the number of measures to be considered in pairing by computing composite scores[18] The achievement and intelligence test scores were converted by the method of equal variabilities. According to this method the scores on one test are multiplied by the ratio of the standard deviation of the scores on the other test over the standard deviation of the scores on the first test. Then composite scores are obtained by combining the converted scores for the individual pupils. The pairing is thus reduced in complexity since fewer measures must be considered in the selection of pupils.

No one of the techniques described may be called the best. The use of chance is the most feasible when one wishes to use very large groups.

---

[16] Gates, A. I., and Taylor, G. A. "An Experimental Study of the Nature of Improvement Resulting from Practice in a Mental Function," *Journal of Educational Psychology*, XV (December, 1925), p. 585.

[17] Douglass, H. R. "An Experimental Investigation of the Relative Effectiveness of Two Plans of Supervised Study," *Journal of Educational Research*, XVIII (October, 1928), pp. 240-41.

For a more extended account see:

Douglass, H. R. "The Experimental Determination of the Relative Effectiveness of Two Sequences in Supervised Study," *University of Oregon Publications*, I, No. 4 (Eugene: University of Oregon, 1927), pp. 173-218.

[18] The procedure employed by Douglass is interesting since he not only used composite scores, but because he reduced variable errors by first obtaining regressed or estimated true scores.

The use of ordinary school classes, whose degree of equivalence is later checked, is to be commended since it causes little change in the usual schoolroom conditions. That groups should be equivalent with respect to measures of general intelligence has become rather well accepted among research workers in education. More careful experimenters go even further and strive to secure groups which are identical on the basis of several criterion measures including intelligence test scores. Since the use of several criteria as bases makes selection difficult, the use of composite scores would seem an effective technique. The use of composite scores, however, implies weighing of criteria, and research is needed to determine appropriate weights. Until this has been done, it would seem best to pair pupils with respect to intelligence test scores and to check the equivalence of other criteria, such as chronological age, previous achievement in the field of experimentation, study habits, personality traits, and physical condition by comparison of means and standard deviations of measures which have been made of them.[19] In addition, the groups should be checked for the purpose of determining whether or not they are approximately alike with respect to sex and race. If measures of traits other than intelligence are thus checked, it is frequently possible to make adjustments toward more perfect equivalence, or if adjustment is not possible, to make appropriate allowances for imperfections in equivalence, thus discovered, in formulating conclusions. Whatever technique of securing equivalence is used, and whatever traits are considered, they should be the ones most appropriate to the problem and to the conditions under which the experiment must be conducted. The degree of elaborateness must be balanced against the artificiality of conditions which it may create, the cost of tests, the time, the number of cases, and other factors.

[19] For a description of this technique as well as a discussion of the criteria for which equivalent should be sought, see:

Monroe, W. S., and Engelhart, M. D. "Experimental Research in Education," *University of Illinois Bulletin*, XXVII, No. 32, Bureau of Educational Research Bulletin No. 48 (Urbana: University of Illinois, 1930), p. 19-30.

# MINOR STUDIES ON OBJECTIVE EXAMINATION METHODS

## III. Specific Determiners in True-False Statements[1]

I. H. BRINKMEIER AND G. M. RUCH
*University of California*

DEFINITIONS.—A specific determiner may be defined as any clue afforded by the phrasing or by the length of a statement which tends to determine the pupil's response in the absence of knowledge. The term "phrasing" includes words such as, *always, never, some, usually, often,* etc.; certain phrases such as, *more than, as large as, because of,* etc.; and a subtle factor of a general, circumstantial nature.

*Purpose of the Study.*—The purpose of the present study verifies and extends Weidemann's study of specific determiners. Weidemann[2] found that statements containing *always, never,* etc. are false more often than true, that clauses expressing *cause* or *reason* are false more often than true, and that clauses expressing *degree* or *comparison* are more often true than false.

The procedure includes the discovery of specific determiners in the statements analyzed, the tabulation of the distribution of these determiners in true and false statements, and a comparison of Weidemann's results with those of the present study. The evidence that certain statements are of such a general or circumstantial nature as to convey a subtle suggestion of truth was reported in another paper.[3]

*Sources of Data.*—The data used as a basis for this study were derived from 376 objective examinations[4] constructed by high-school teachers for their own classroom use. These 376 examinations contained in all 10,756 true-false statements.

*Method of Procedure.*—The determiners reported here were classified into 15 groups. A presentation of the data for the entire 15 groups is

---

[1] This paper is an abstract of Chapter III of *The Technique of Constructing Objective Examinations,* a Ph.D. dissertation at the University of California, 1929. The senior author is indebted to Dr. G. M. Ruch under whose guidance the research was carried out, for suggesting the study, and for valuable criticisms.

[2] Weidemann, C. C. *How to Construct the True-false Examination.* Teachers College, Contributions to Education, No. 225. New York: Teachers College, Columbia University. 1926.

[3] Brinkmeier, I. H., and Keys, Noel. *Circumstantiality as a Factor in Guessing on True-false Examinations,* to appear in the *Journal of Educational Psychology.*

[4] The writer is indebted to Drs. G. M. Ruch and G. A. Rice for permission to analyze these 376 examinations received by them in a nation-wide prize contest. Thirty-five of these examinations are included in the volume *Specimen Objective Examinations,* published in March, 1930, by Scott, Foresman and Co.

not possible in a brief paper. A few selected samples from each group will serve to illustrate the various types of determiners studied.

CLASSIFICATION OF DETERMINERS

I. Words, Phrases, and Clauses as Determiners

*Group I.* Adverbs expressing absoluteness.

The entire list of adverbs included: *totally, entirely, exactly, completely, solely, fully, exclusively, very, perfectly, absolutely,* and *identically.* Samples of this group are:

1. "A party platform is always *fully* satisfactory to all members of the party."
2. "The composition of the air is *absolutely* uniform."
3. "The direction roots grow in depends *entirely* upon gravity."

*Group II.* The adjective *all.* Samples of statements in this group are:

1. "*All* writing is literature."
2. "*All* cattle pay their owners."
3. "*All* cosmetics are harmful."
4. "*All* the living cells of the body live under water."
5. "Are *all* men six feet tall?"
6. "*Todas* las puertas se cieran solas."

*Group III.* The adverb *always.* Samples of statements containing the adverb *always* are:

1. "A party platform is *always* fully satisfactory to all members of the party."
2. "Solem non *semper* videmus."
3. "Clear water is *always* pure."
4. "Los alumnos *siempre* se saben la leccion."

*Group IV.* Statements containing clauses expressing *cause* or *reason.* Samples of such statements are:

1. "Invention is a bad thing *because it throws so many out of work.*"
2. "*Since gold and silver are in circulation in the United States,* the coinage is bimetallic."
3. "The Quakers were very unpopular with the Puritans of the New England colonies *because of their religious beliefs.*"

*Group V.* The terms *no, none, not, nothing.*

Samples of statements containing these terms are:

1. "The sun has *no* effect upon causing waves."

2. "Sugar is *not* limited to hot climates."
3. "*No one* can get along with three hours sleep a day just because Edison and Napoleon have done so."

*Group VI.* The words *only* and *alone*. Samples of statements containing these words are:

1. "Romance can be written *only* in verse."
2. "The Germans were the *only* people who thought they were superior to others."
3. "Air is the *only* substance which carries sound."
4. "May Congress *alone* amend the Constitution?"

*Group VII.* The adverb *never*. Samples of statements in this group are:

1. "Gold *never* varies in value."
2. "In Biology we *never* have a plan of division of labor."
3. "The heart *never* rests."
4. "The body *never* wears out any of its cells."

*Group VIII.* Statements containing one or more specific citations or enumerations. Samples of this group are:

1. "George Eliot *was one of the* most learned women of her day."
2. "Lowell *was one of* America's greatest literary critics."
3. "Daniel Boone *was one of* our presidents."

*Group IX.* Statements containing expressions of *degree* or *comparison*. This group included the following expressions: *more than, less than, larger than*, etc. Samples of these statements are:

1. "The English novel was developed *earlier than* the English drama."
2. "Milton shows *more* humor *than* Shakespeare."
3. "The earth rotates *faster* at the equator *than* at the poles."

*Group X.* Statements containing a clause introduced by *if*. Samples of such statements are:

1. "*If* any theorem is true its converse must be true."
2. "Winds would blow in a straight line *if* it were not for the mountains."

*Group XI.* The use of *may* expressing possibility. Samples of this usage are:

1. "Water *may* be solid."
2. "Carl Sandburg *may* be likened to Robert Burns in lacking a formal academic training."

3. "Personal hygiene *may* be controlled by legislation."

*Group XII.* Words and phrases expressing a general though not universal occurrence. This group included: *usually, generally, most, commonly, as a rule, as a whole, even if, almost all, mainly,* and *almost entirely.* Samples of this group are:

1. "Indians, *as a rule,* responded to the treatment they received."
2. "*Most* of California's highways are usable all the year through."
3. "The early newspapers *mainly* reported European affairs."

*Group XIII.* Words expressing a certain indefinite occurrence. This list included: *Some, sometimes, often, frequently, several, many, probably, approximately, largely,* and *ever.* Samples of this study are:

1. "*Many* people of the Negro race live in Africa."
2. "Laws, customs, beliefs, have been *frequently* changed."
3. "*Some* of Browning's poems are rather obscure."
4. "Newspaper editors *sometimes* play upon prejudices."

*Group XIV.* The use of *should* expressing obligation or duty. Samples of this usage are:

1. "People who handle food *should* have a physical examination before employment."
2. "A person *should* keep himself in the "pink of condition."

Examples have just been given for fourteen of the fifteen classes of specific determiners noted. The fifteenth group (sentence-length) has been reserved for a separate report[5] since the determination of the answer, in this case, falls into a somewhat different category. In the first fourteen groups the clue to the answer exists, usually, in a single word or phrase of the statement.

*Results of the Analysis.*—Table I presents a summary of specific determiners in the present data. The following statements cover the principal findings shown in this Table:

1. A total of 2018 specific determiners was found among the 10,756 true-false statements of the 376 examinations analyzed. When the statements involving circumstantiality[6] are included, 19.7 percent or one-fifth of all of the true-false statements contain clues to the correct answers. This statement is based on a tabulation of the correct answers as given

[5] Brinkmeier, Ina Hill. "Sentence-Length as a Specific Determiner in True-False Statements," to appear in the *Journal of Educational Research.*

[6] The total number of statements recorded in this phase of the investigation amounted to 104.

TABLE I

DISTRIBUTION OF 2018 SPECIFIC DETERMINERS IN 10,756 TRUE-FALSE STATEMENTS

| Group | Word or phrase | Number | | Total | Percent | | P.E. of Percent |
|---|---|---|---|---|---|---|---|
| | | True | False | | True | False | |
| I. | Adverbs expressing absoluteness* | 3 | 28 | 31 | 9.7 | 90.3 | 3.6 |
| II. | all | 52 | 187 | 239 | 21.8 | 78.2 | 1.8 |
| III. | always | 31 | 95 | 126 | 24.8 | 75.2 | 2.6 |
| IV. | never | 13 | 38 | 51 | 25.5 | 74.5 | 4.1 |
| V. | no, none, nothing | 40 | 150 | 190 | 21.0 | 79.0 | 1.9 |
| VI. | only, alone | 7 | 70 | 77 | 9.1 | 90.9 | 2.2 |
| VII. | cause or reason | 65 | 122 | 187 | 34.7 | 65.3 | 2.2 |
| VIII. | enumeration | 75 | 15 | 90 | 83.3 | 16.7 | 2.7 |
| IX. | degree or comparison** | 121 | 116 | 237 | 51.1 | 48.9 | 2.2 |
| X. | if | 98 | 81 | 179 | 55.3 | 44.7 | 2.4 |
| XI. | may | 81 | 23 | 104 | 77.9 | 22.1 | 2.8 |
| XII. | expressing extensive occurrence*** | 104 | 37 | 141 | 73.8 | 26.2 | 2.5 |
| XIII. | expressing indefinite occurrence**** | 82 | 20 | 102 | 80.6 | 19.4 | 2.6 |
| XIV. | should | 55 | 29 | 84 | 65.5 | 34.5 | 3.5 |
| XV. | sentence-length (26 or more words) | 142 | 38 | 180 | 78.9 | 21.1 | 2.1 |
| | | | | 2018 | | | |

* The inventory of words classified here included: totally, entirely, exactly, completely, solely, fully, perfectly, absolutely, identically.

** Expressions of degree or comparison included in this group were: less than, more than, as much as,—er than (larger than, etc.)

*** The words and phrases classified in this group included: almost all, almost entirely, nearly all, as a whole, as a rule, in the long run, generally, largely, mainly, most (38T, 14F), usually.

**** This classification included: frequently, often (20T, 1F), some (22T, 19F), sometimes, many, several, probably, seldom, few, any, to a considerable degree.

in the answer keys provided by the teachers constructing the examinations, or, in the absence of an answer key made by the teacher, a tabulation of the answers given as correct by competent students of the particular subject matter is used as a basis. In many cases these students were teachers of the subject matter of the test.

2. Among the 10,756 statements there were 31 statements or 0.3 percent containing adverbs expressing absoluteness, of which 28 were true and three were false.

3. Among these statements there were 239 or 2.2 percent containing the word *all*. Of these, 187 were false and 52 were true. These 239 determiners comprised 11.3 percent of the entire 2018 determiners. Of the 239, 130 were found in the social studies and of the 130 found in the social studies, 104 were false and 26 were true.

4. Of 126 statements containing the word *always*, 95 were false and 31 were true. Of these 126, 32 were found in the social studies and 40 were found in the natural sciences. Of those in the natural sciences, 23 were false and 17 were true, while those in the social studies were false to the number of 29 with only three true ones.

5. Among 51 statements containing the word *never*, 38 were false and 13 were true.

6. Among 190 statements containing the words *no, not, none, nothing,* 150 were false and 40 were true.

7. Among 77 statements containing the words *only* or *alone,* 70 were false and 7 were true.

8. Of 187 statements containing a *cause* or *reason* clause, 122 were false and 65 were true.

9. Among 90 statements containing a *specific citation* or *enumeration,* 75 were true and 15 were false.

10. Of 237 statements containing an expression of *degree* or *comparison,* 121 were true and 116 were false.

11. Of 179 statements containing clauses introduced by *if,* 98 were true and 81 were false. These statements were found almost exclusively in Mathematics.

12. Of 104 statements containing *may* expressing possibility, 81 were true and 23 were false.

13. Of the 141 statements containing such words as *most, generally, usually, as a rule, mainly,* etc., 104 were true and 37 were false.

14. Of 102 statements containing such words as *some, sometimes, frequently, often, many,* etc., 82 were true and 20 were false.

15. Of 84 statements containing the word *should* expressing obligation or duty, 55 were true and 29 were false.

These facts lead to the statements that in these examinations:

1. Four out of five statements containing *all* are false.

2. Three out of four statements containing *always* or *never* are false.

3. Four out of five statements containing *no, none,* or *nothing* are false.

4. About nine out of ten statements containing *only* or *alone* are false.

5. Two out of three statements containing clauses of *cause* or *reason* are false.

6. Four out of five statements containing enumerations are true.

7. Statements containing expressions of degree or comparison are as often true as false.

8. Statements containing an *if* clause are as often true as false.

9. Three out of four statements containing *may* expressing possibility are true.

10. Three out of four statements containing such words as *most, some,* often, generally, etc., are true.

11. Statements containing *should* are probably more often true than false.

## II. Certain Comparisons of the Present Study with Weidemann's Study of Specific Determiners

Weidemann classified the determiners which he studied into four general groups as follows:[7]

Group I. *Always* and *never* (also the word *not*).

This group included *all, always, alone, any, complete, entirely, everything, forever, constantly, impossible, no, none, nothing, never, not any, not, permanently, solely, only, totally, universal, wholly,* and *whenever.*

Group II. *Almost always, almost never,* etc.

This group included *abundant, among the strongest, almost entirely, as a rule, almost none, a very few, commonly, chief, extensive, extremely, essentially, frequently, generally, grievous, greatly, highly, in the main, in part, important, increasingly, large, largely, little, most, much, most of, numerous, not often, nearly all, one of the* (simplest), *often, occasionally, predominantly, principal, prevailing, primarily, seldom, some, superior, specially, usually, unusual, too much, tendency to, very* (strong), *rapid* (urbanization).

Group III. *Equal to, congruent to, similar, equivalent to, same size as.*

Group IV. Degree or Comparison.

This group included *more than, less than, ..er than, the more...the less, the more...the more, the less...the less, the less...the more.*

In Table I are found 15 groups in which there are 11 groups that correspond generally to the four groupings made by Weidemann. In a comparison of the two studies a difficulty is at once encountered, viz., that Weidemann combined many more determiners in each of his groups than did the present writer. A careful scrutiny of the two studies reveals the facts that

1. Groups I, II, III, IV, V, and VI of the present study are included in Group I of Weidemann's study.

2. Groups VIII, XII, and XIII are included in Group II of Weidemann's study.

3. Group IX of the present study corresponds to Group IV of the classification made by Weidemann.

4. Group VII of the present study corresponds to a classification

[7] Weidemann, C. C. *How to Construct the True-False Examination.* Teachers College, Columbia University, Contributions to Education, No. 225. p. 69.

made by Weidemann which for purposes of discussion the writer designates as Group III.

Table II presents the comparison of the two studies.

TABLE II

SUMMARY OF THE RESULTS OF WEIDEMANN'S STUDY* OF SPECIFIC DETERMINERS COMPARED WITH THE RESULTS OF THE PRESENT STUDY

| Group | Word or Phrase | Number | | | Percent | | P.E. of Percent |
|---|---|---|---|---|---|---|---|
| | | True | False | Total | True | False | |
| I | | | | | | | |
| Weidemann I | always, never, etc. | 113 | 212 | 325 | 34 | 66 | 1.77 |
| Brinkmeier I, IV, V, VI, II, III. | always, never, etc. | 153 | 569 | 722 | 21 | 79 | 1.02 |
| II | | | | | | | |
| Weidemann II | almost always, etc. | 112 | 106 | 218 | 51 | 49 | 2.28 |
| Brinkmeier VIII, XII,XIII | almost always, etc. | 265 | 74 | 339 | 78 | 22 | 1.55 |
| III | | | | | | | |
| Weidemann III | cause or reason | 38 | 85 | 123 | 31 | 69 | 2.42 |
| Brinkmeier VII | cause or reason | 66 | 125 | 191 | 34 | 66 | 2.20 |
| IV | | | | | | | |
| Weidemann IV | degree or comparison | 83 | 47 | 130 | 64 | 36 | 2.80 |
| Brinkmeier IX | degree or comparison | 123 | 117 | 240 | 51 | 49 | 2.20 |

* Weidemann, C. C., *loc. cit.*, pp. 68-70.

*Results.*—From Table II it may be seen that the findings in Group III are approximately in agreement, that is to say, both writers found two out of three *cause* or *reason* statements to be *false*.

The findings in Group I are in accord with regard to statements containing *always* or *never*. It should be noted, however, that the present writer found a larger percent of such statements to be false than did Weidemann, since her findings indicate that about three out of four statements containing *always* or *never* are false, while Weidemann found about two out of three to be false.

The findings of the two writers in Group II differ significantly. Weidemann found statements containing *almost always, almost never, generally*, etc. to be about as often true as false, while the present writer found such statements to be true about four out of five times.

The findings in Group IV also differ. Weidemann found two out of three clauses expressing *degree* or *comparison* to be true, while the present writer found such statements to be true only about as often as false.

Possible explanations for the disagreement in the results of the two studies are:

1. The data used by Weidemann were a more limited sampling since his examinations were made by college instructors in courses in contemporary civilization, government, economics, plane geometry, and physics, in Columbia College. The data analyzed in this study are more

representative in that they come from all sections of the United States, and were intended for high-school teachers for classroom use.

2. Weidemann's grouping was coarser than that of the present writer. As mentioned earlier, his four groups included eleven groups of this study.

*The Control of Specific Determiners.*—Brinkley, one of the first investigators of true-false statements, says, "In general, it is wise to avoid questions containing the statement that a given fact is always true or never happens."[8]

Weidemann says, "Do not avoid *always* and *never* statements. Formulate *always* and *never* statements so that about one-half are true and about one-half are false. Avoid using more than one specific determiner of truth or falseness in one statement."[9]

It seems to the writer that the control of specific determiners is desirable and necessary and may be accomplished by a more thorough, careful study of the use of determiners. A studied effort to balance approximately the number of true and false statements containing any one individual determiner will aid in eliminating the influence of the determiner.

---

[8] Brinkley, S. G. *Values of New Type Examinations in the High School.* Teachers College, Columbia University, Contributions to Education, No. 161. p. 38.

[9] Weidemann, C. C., *loc. cit.*, pp. 72-73.

# STUDENT RESPONSES IN THE MEASUREMENT OF READING COMPREHENSION

SPENCER SHANK
*University of Cincinnati*

FOR the greater part of the last twenty years we have been attempting, in a more or less objective manner, to measure a pupil's ability to comprehend what he reads. Usually, this measurement has been done by using the so-called objective test. A great variety of techniques has been used in various reading tests to determine pupils' ability to comprehend. Herewith are set forth the findings from an investigation into the nature of those methods with their classification, frequency of occurrence, and relative importance.

The most cursory inspection of only a few reading tests will show that the methods referred to above are schemes which have been employed by test authors in devising situations which require pupil responses. These responses are supposed to reveal comprehension. It must be admitted that the effectiveness of the objective comprehension test depends solely upon the recorded responses. In other words, if a pupil comprehends what he reads and fails to record his reactions, so far as the test is concerned he has not comprehended. This investigation soon became a matter of determining what types of response situations have been used in constructing objective reading tests.

In securing the materials for the investigation, eliminations were made in order to confine the study to the work above the lower primary level. Thus, tests planned for Grades I and II, those planned for college students, and those intended for clinical and other special uses were eliminated. Incidentally, it may be stated that no types of responses appear in the tests thus excluded which are not found in the tests which were used. After all eliminations had been made, forty-seven tests were analyzed. The forty-seven tests included most of the early tests, beginning with the Starch Test (1914) and the Gray Silent Reading Test (1915), and all subsequent tests available.

Before beginning the analysis, inquiry was made of the Bureau of Administrative Research, University of Cincinnati, as to which tests were most commonly called for. From the Bureau's records, the names of the ten tests having the highest sales were secured. These ten tests were carefully inspected and analyzed for the student response situations

used in their construction. This trial analysis provided material for an outline or classification scheme which was used in completing the analysis of the forty-seven tests.

When the first ten tests were analyzed, it was evident that certain responses were used repeatedly, and that if frequencies were tabulated these responses would dominate. It was also evident that certain responses varied from each other by only small differences. Such close similarity led to the establishment of fairly general groups or types of responses. Six general types were found which are divisible into smaller sub-types. The six general types were:

Type I: Responses based upon giving thought stated directly in the content.

Type II: Responses based upon giving thought implied in the content.

Type III: Responses based upon determining whether given statements are true or false.

Type IV: Responses based upon following directions.

Type V: Responses based upon selecting words of synonymous or similar meanings.

Type VI: Responses based upon recognizing word or content meaning in accompanying illustrations.

Nine other distinct types were found, which were not divisible into sub-types. This latter group of responses may be considered together, and in this analysis has been called:

Type VII: Responses of miscellaneous character, not divisible into sub-types.

Herewith is given in brief the detail of each of the seven general types of response with the various divisions of each.

*Type I:* Responses based upon giving thought stated directly in the content.

1. Question,* write answer found directly in the content.

2. Question, answer by indicating word or statement (multiple choice) found directly in the content.

3. By direction, indicate a word or the best fitting statement (multiple choice) found directly in the content.

4. By direction, write or indicate a word or statement, not multiple choice, found directly in the content.

* The terms "Question," "By direction," etc., signify that the response situation has been placed in the form of a question, a direction to do, etc.

5. Sentence completion, indicate a word or statement (multiple choice) found directly in the content.

6. Sentence completion, write missing word, not multiple choice, found directly in the content.

*Type II:* Responses based upon giving thought implied in the content.

1. Question, write answer implied in content details; may include "yes" or "no" answers.

2. Question, answer by indicating word or statement (multiple choice) implied in content details.

3. Question, answer by indicating a word or statement (multiple choice) implying the content meaning as a whole.

4. By direction, indicate a word or statement (multiple choice) implied in the content details.

5. By direction, indicate a word or statement (multiple choice) implying the content meaning as a whole.

6. Sentence completion, indicate a word or statement (multiple choice) implied in the content details.

7. Sentence completion, simple, not related to previous content, implied meaning, may be multiple choice.

8. Sentence completion, write missing word, not multiple choice, meaning implied in content details.

*Type III:* Responses based upon determining whether given statements are true or false.

1. Indicate true statement or statements.

2. Indicate false statement or statements.

3. Indicate for each statement, true or false, or not known.

*Type IV:* Responses based upon following directions.

1. Follow directions, simple and direct. This type usually involves picture completion.

2. Follow directions, dependent upon interpretation of content.

*Type V:* Respon es based upon selecting words of synonymous or similar meanings.

1. Indicate or give a word or statement from the content synonymous with a given word or statement.

2. Indicate or give a word or statement synonymous with a word or statement given in the content.

3. Match words on their own meanings; not related to accompanying content.

*Type VI:* Responses based upon recognizing content meaning in accompanying illustrations.

1. Indicate pictures illustrating events true or relevant to content.
2. Indicate pictures illustrating events not true or irrelevant to content.

*Type VII:* Responses of miscellaneous character, not divisible into sub-types.

1. Indicate a word in a sentence or paragraph whose meaning is incongruous with the remainder of the content.
2. Indicate an extra or irrelevant word in a sentence.
3. Answer questions from previous experience.
4. Answer question or check statement from own information by "yes" or "no."
5. Indicate a statement (multiple choice) of the best predictive thought.
6. Completion, build a new theme by supplying missing words.
7. Organize thoughts (words or complete statements) into a regular order.
8. Indicate objects or thoughts to which given words refer.
9. Determine whether or not the content contains a certain definite idea or fact.

In Table I are presented the names of the forty-seven reading tests with indications of the types of responses found in each. It should be pointed out that decisions, as to the exact general type and sub-type into which a few responses of certain tests should be classified, were difficult to make. Two reasons contributed to this difficulty:

(1) Certain sub-types are very similar to each other, and

(2) Certain tests present a few responses in such a manner that they might be classified under more than one sub-type. This was particularly true where statements within the test were not clear but were involved. The writer wishes to state that all such responses were more or less arbitrarily placed under the general and sub-types where they seemed best fitted. In no case was a response placed under more than one sub-type.

In analyzing those tests which present two or more forms, it was noticed that the various types used and number of responses per form were not always held constant. This is scarcely evident in the more recent tests which are designed to be diagnostic, but is not infrequent in the tests arranged to measure unspecified or general achieve-

TABLE I

ANALYSIS OF STUDENT RESPONSES FOUND IN 47 SILENT READING TESTS

| NAME OF TEST | GENERAL TYPES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | | | | | II Specific Types | | | | | | | | | III | | | IV | | V | | | VI | | VII | | | | | | | | | Gen.* | Spec |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| 1. Adams Silent (a) (1920) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| 2. Bolenius (1923) | | x | | x | | | x | | | x | | | x | | | x | | x | | | | | | | | | | | | x | x | | | 5 | 10 |
| 3. Burgess Scale (1920) | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | 1 | 1 |
| 4. Chapman Cook (1924) | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | 1 | 1 |
| 5. Chapman Unspeeded (1925) | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | 1 | 1 |
| 6. Courtis Stan. R. (1917) | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| 7. Dearborn Westbrook (1926) | x | | | | | x | x | | | | | | | x | | | | | | | | | | x | x | | | | x | | | | x | 2 | 2 |
| 8. Denver Diagnostic (1927) | | x | | | x | | | x | x | | | x | | | | | | | | | | | | | | | | x | | | | | | 4 | 7 |
| 9. Detroit Examination (1922) | | x | | | x | | | x | x | | | x | x | | | | | | | | | | | | | | | | | | | | | 2 | 5 |
| 10. Detroit Test (1927) | | x | | | x | | | x | | | | x | | | | | | | | | | | | | | | | | | | | | | 2 | 6 |
| 11. Fordyce Scale (a) (1916) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 4 |
| 12. Fordyce Test (a) (1923) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| 13. Gates Silent (1926) | | x | | | | | | | | | x | | | | | | | | x | | | | | | | | | | | | | | | 1 | 1 |
| 14. Gray Silent (1915) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | 4 | 4 |
| 15. Haggerty Examination (1919) | | | x | | x | | | | | x | x | | | | | x | | | x | x | x | x | | | | | | x | | | | | | 1 | 1 |
| 16 Holmes Test (a) (1915) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | 11 |
| 17. Indiana Achievement (1927) | | | | | | | | | | | | | | | | | x | | | | | x | | | | | | | | | | | | 1 | 1 |
| 18. Iowa Silent (1927) | x | | | x | x | | | | | | | | x | | | | | | x | | | | | | | | | | | | x | | | 2 | 2 |
| 19. Kansas Silent (1915) | | | | | | | x | | | | | | | | | | | | x | | | | | | | | | x | | | | | | 4 | 7 |
| 20. Lippincott Chapman (1920) | x | | | | | | | | | | x | | | | | | | | | | | | | | | | x | | | | | | | 3 | 4 |
| 21. Los Angeles Elementary (1926) | x | | | x | | x | x | x | | x | x | x | | x | | x | | | | | x | | | | | | | | | x | x | | | 2 | 2 |
| 22. Los Angeles Primary (1925) | x | | | x | | | x | | | x | x | x | | | | x | | | x | | | | | | | | | | | x | x | | | 5 | 13 |
| 23. Lowry (a) (1926) | | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | | | | x | 6 | 10 |
| 24. Monroe Standardized (1920) | x | x | x | x | | | | x | | x | | | | | | | | | x | | | | | | | | | | | | | | x | 2 | 2 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 7 |

## TABLE I—Continued

### Analysis of Student Responses Found in 47 Silent Reading Tests—Continued

| NAME OF TEST | GENERAL TYPES: I | | | | | | II Specific Types | | | | | | | | III | | | IV | | V | | | VI | | VII | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Gen.* | Spec. |
| 25. Natural Group (a) (1922) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| 26. North Carolina (1927) | | | | x | | | | | | x | x | | | | | | | | | | | | | x | | | | | | | | | | 1 | 1 |
| 27. Poley Precis (1927) | | | | | | | | x | | | | | | | | | | | | | | x | | | | | | | | | | | | 2 | 3 |
| 28. Pressey Diagnostic (1925) | | x | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | | 4 | 4 |
| 29. Pressey Narrative (1922) | | x | x | | | | | x | | | x | | | | | | | | | | | | | | | | | | | | | | | 2 | 4 |
| 30. Pressey Speed (1921) | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | 1 | 1 |
| 31. Pressey Third Grade (1921) | | x | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 |
| 32. Public School (1928) | x | | x | x | x | x | x | x | | x | x | x | | x | | | | | | | | | | | | | | x | x | | | | | 4 | 13 |
| 33. Regents (1928) | x | | | x | | x | x | | | x | | | | | x | | | | | | | x | | | | | | | | | | | | 4 | 7 |
| 34. Sangren Woody (1927) | x | | | | | | | | x | x | | | x | | | | | x | x | | | | | | | | | | | x | | | x | 4 | 8 |
| 35. Stanford Achievement (1922) | | | | | | x | | | | | | | x | x | | | | | | | | | | | | | | x | | | | | | 3 | 4 |
| 36. Starch Test (a) (1914) | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| 37. Stone Narrative (1922) | | x | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 |
| 38. Thorndike-McCall (1920) | x | | | x | | | x | | | | | | | | | | | | | x | x | | | | | | | | | | | | x | 4 | 6 |
| 39. Thorndike Scale II (1920) | x | | | | | | | | | | | | | | | | | x | | x | | | | | | | | | | | | | | 3 | 3 |
| 40. Van Wagenen Scale (1922) | | | x | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 |
| 41. Virginia Minnesota (1923) | x | | | | | | x | x | | | x | | | | | | | | x | | | | | | | | | | | | | | | 3 | 5 |
| 42. Whipple H. S. (1926) | x | | | x | | | x | | | x | | | | | | | | | x | | | | | | | | | | | | | | | 3 | 5 |
| 43. Williams Primary (1926) | x | | | | | | | | | | | x | | | | | | | | | x | | | | | | | | | | | | | 3 | 3 |
| 44. Williams Test (1929) | x | | | | x | | | | | x | x | | | | | x | | | | | x | x | x | | | | | | | | | | | 4 | 8 |
| 45. Wisconsin Supervisory (1922) | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | 1 | 1 |
| 46. Witham Silent (1921) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | 1 | 1 |
| 47. Wyoming State (1928) | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| | 22 | 10 | 5 | 11 | 7 | 5 | 11 | 11 | 3 | 13 | 9 | 8 | 5 | 4 | 5 | 2 | 1 | 8 | 7 | 6 | 5 | 3 | 1 | 2 | 2 | 2 | 1 | 6 | 2 | 1 | 5 | 2 | 5 | | |

Number of tests using General Types: I–36; II–30; III–7; IV–12; V–10; VI–2.

(a) Signifies that the reading content is to be removed or concealed before the reader responds to the test questions.

* In computing the general types used by a single test, each type under VII was computed as a distinct general response.

ment in reading. Of the latter group, it may be said that different response situations presented in the right arrangement seemingly have had equivalent resulting value in the measurement of comprehension. If this assumption were not true, the various forms of some tests would not be equivalent or of adequate reliability.

In Table I, only abbreviated test names have been given, sufficient for identifications, however. An inspection of the table will show some very definite and interesting facts, from which certain conclusions may be drawn. The most important are:

I. Fifteen of the forty-seven tests have used only a single type of response in their measurement of comprehension. These include several of the earlier tests as well as one or two of the more recent ones. The conclusion might be made that a number of test authors have assumed that a student's comprehension may adequately be revealed by a single type of response or test work.

II. Responses which have been used singly are these:

1. Answering questions whose answers are stated directly in the content;
2. Indicating a word or statement found directly in the content;
3. Indicating a word whose meaning is incongruous with the remainder of the content;
4. Indicating an extra or irrelevant word in a sentence;
5. Following directions;
6. Answering questions from own information;
7. Organizing statements or thoughts into a regular order.

It is obvious that several of these types present wide differences. This fact assumes striking significance when one considers that each is attempting singly to arrive at the same goal—a measurement of the reader's comprehension.

III. General Type I has been used in the construction of the greatest number of tests, as indicated by the frequencies given at the bottom of Table I. This means that asking the student to give thoughts stated directly in the content outranks all other types as judged by the number of authors using it, thirty-six out of forty-seven. General Type II, asking for thought implied in the content, has been used in thirty of the forty-seven tests; following directions has been used in twelve tests; giving words of synonymous meaning has been used in ten tests. Other general types are used in six or less tests each. We may consider these frequencies as indicating the importance that test-authors have held as

to the effectiveness with which the different general types measure comprehension.

IV. By far the most frequently used specific type of response is Type I-1. This is the direct question-answer situation wherein the student writes his response to a question whose answer is stated directly in the content. No suggested answers are given. This specific type is found in twenty-two tests. Another frequently used specific type is Type II-1. This represents the direct question also, but the answer is implied in the content details. Eleven tests use this type of response.

V. Tests which have used combinations of general types of responses in their construction, present an interesting study. In computing the data for the following statements, each division of General Type VII has been considered a distinct type of response. The Bolenius Tests use seven general types, but, however, they serve a purpose other than that of the general standardized achievement test, in that they are for particular use with the Bolenius Readers. The Haggerty Examination, Los Angeles Elementary and Primary Tests, use six general types; the Iowa Silent and the Sangren Woody Tests use five general types; the Dearborn-Westbrook, the Gates Silent, the Pressey Diagnostic, the Public School Achievement, the Regents (1928), the Thorndike-McCall, and Williams tests use four general types; seven tests use three general types, etc. In Table II, page 127 are given the totals for all of the forty-seven tests. In the three tests using six general types, one uses ten special types, one uses twelve, and one uses fifteen. It is obvious that a test may use several ways to present the same general response situation. For example, the Los Angeles Elementary Test uses eight sub-types in which to ask a student to give a thought which is implied in the reading content. The Public School Achievement Test uses seven sub-types in asking for the same general response. Examples of almost any other combination of specific types under a single general type may be found. Either test-authors have considered certain general types to be superior in their measurement of comprehension, or little thought has been given to the close similarity existing between the specific responses employed.

VI. The frequency with which new tests have appeared from year to year shows only one definite trend. If we assemble the dates and the number of tests for each of the several years, we have an irregular distribution. It should be pointed out that these data include only the 47 tests analyzed in this investigation. This represents, however, approximately a 70 percent sampling of all reading tests published.

TABLE II

NUMBER OF TESTS PUBLISHED, SHOWN BY DATES OF PUBLICATION

| *Year* | *Number of Tests Published* |
|---|---|
| 1914 | 1 |
| 1915 | 3 |
| 1916 | 1 |
| 1917 | 1 |
| 1918 | 0 |
| 1919 | 1 |
| 1920 | 7 |
| 1921 | 3 |
| 1922 | 7 |
| 1923 | 3 |
| 1924 | 1 |
| 1925 | 3 |
| 1926 | 5 |
| 1927 | 7 |
| 1928 | 3 |
| 1929 | 1 |
| Total | 47 |

The years of 1916-1919 seem to be the lean years for the appearance of new tests. Whether or not this is due to the influence of the World War, it may be impossible definitely to conclude. The war, however, probably did have some influence, since our experimentation for those years tended to follow other paths. In 1920, seven new tests were published. This number has not been exceeded but has since been equaled in 1922 and 1927. There seem to be no significant reasons for the decided fluctuations noticed between consecutive years. Investigations in reading have steadily increased, and from most recent reports the present-day interest has in no way subsided.[1]

If the data from Table II are rearranged such that the time is divided into four-year periods, a steady increase in the appearance of reading tests may be shown. Such arrangement is given in Table III.

TABLE III

NUMBER OF TESTS PUBLISHED, SHOWN BY FOUR-YEAR PERIODS

| *Years* | *Number of Tests Published* |
|---|---|
| 1914-1917 | 6 |
| 1918-1921 | 11 |
| 1922-1925 | 14 |
| 1926-1929 | 16 |
| Total | 47 |

VII. The earlier tests and the more recent tests present wide differences in the number of responses used in their construction. Of the earliest tests, the Starch Test (1914), the Gray Silent (1915), the Holmes

[1] This statement may be proven by noting the reports as given in the Supplementary Educational Monographs, Number 28 (1925) and the subsequent annual supplements. University of Chicago Press.

Silent (1915), and the Fordyce Scale (1916), all used the same single response: Asking the student a question whose answer may be found stated directly in the content. In all four of these tests, the reading content was removed from sight before the answers to the questions were written. Several other earlier tests intended for Grades I-II were constructed on the same single response.

The Kansas Silent Reading Test (1915) and the Courtis Standard Research Test (1917) represent the first tests using more than one type of response. The Kansas Test was the first to present questions whose answers were implied in the content. It asked questions on students' previous experiences and also asked that the student follow directions. The Courtis Standard Research Test asked for responses on implied meaning, and determined whether or not the content stated a certain definite idea or fact. With the advent of these two tests, the single response type of test was largely discarded in test development. In 1917, W. S. Gray wrote a statement which to-day appears truly prophetic:[2]

"The position taken in this monograph is that the mental processes involved in getting meaning are varied and complex. Each of the tests mentioned above measures certain phases of comprehension. A great variety of methods may and should be used in a thoroughgoing test of one's ability to get meaning. Neither a reproduction test, nor answers in questions, nor Kelly's test,[3] nor all combined, serve as a complete test of comprehension."

Gray's statement indicated the true path which subsequent tests have taken. The single response type of test has long been considered inadequate. Recent tests have taken a far wider and more intensive sampling

TABLE IV

THE NUMBER OF TESTS, UNDER DIFFERENT DATES, USING GIVEN NUMBER OF RESPONSES

| *No. of Responses* | *Number of Tests* | | | | |
|---|---|---|---|---|---|
| | 1914-1917: | 1918-1921: | 1922-1925: | 1926-1929 | Totals |
| 1 | 4 | 4 | 5 | 2 | 15 |
| 2 | 1 | 2 | 4 | 5 | 12 |
| 3 | 1 | 2 | 2 | 2 | 7 |
| 4 | 0 | 2 | 1 | 4 | 7 |
| 5 | 0 | 0 | 0 | 2 | 2 |
| 6 | 0 | 1 | 1 | 1 | 3 |
| 7 | 0 | 0 | 1[4] | 0 | 1 |
| Totals | 6 | 11 | 14 | 16 | 47 |

[2] *Studies of Elementary School Reading Through Standardized Tests,* Supplementary Educational Monographs, No. 1 (1917), p. 16.

[3] The Kansas Silent Reading Test.

[4] This is the Bolenius Test whose special function has been pointed out.

of the reader's responses and thereby have aimed to take a wider and deeper measure of the reader's comprehension. That this change has been a growth and not a radical shift may easily be seen when one examines the publication date of the various tests mentioned in Table I.

If we now compare the data in Table III with that in Table IV, we may see that, generally, the number of tests published has increased, and that at the same time the breadth and scope of the tests, as prophesied by Gray, have enlarged.

## SUMMARY

This investigation into the response situations used in the construction of silent reading tests has revealed that:

1. Test-authors have used a wide variety of student responses in test construction.

2. Types of responses might be classified into general groups, with sub-types varying by only small differences.

3. The types of responses within a single test have differed greatly, or have been very similar in nature.

4. Some tests have used only a single type of response; others have used two, three, four or more types.

5. Some tests have used numerous ways in which to present the same general response, and at the same time have used only one way in which to present a widely different general response.

6. In some instances, the number and types of responses have not been held constant from test form to test form.

7. The most frequently used general response has been that of asking the student in some manner to give a thought stated directly in the reading content. The most frequently used specific response has been that of asking the student to write his response to a question whose answer may be found directly in the content.

8. The number of new tests published per year has not been regularly increasing, but if tests are grouped into those published in four-year periods, a general increase may be noted.

9. Coincident with the increase in number of new tests published, there has been a decided broadening in the scope and nature of the tests. The early tests used only one, two, or three types of responses. Recent tests have more than doubled those numbers.

# SHORTER ARTICLES

## THE RELATION BETWEEN THE FREQUENCY AND THE UNIVERSALITY OF TEACHING ACTIVITIES

R. W. TYLER
*Ohio State University*

Two different bases have been used in current curriculum studies to evaluate the performance of activities. Universality in the performance has sometimes been used as the criterion.[1] In other studies, frequency has been the basis for evaluation.[2] By universality is meant the number of persons who perform the activity, while by frequency is meant how often the activity is performed.

Whether universality and frequency are closely related is a question arising whenever an attempt is made to compare the results obtained from a study in which universality is the criterion with the results obtained from a study in which frequency is the criterion. The problem to be solved is this: Are the results comparable when the number of persons performing the activity is the measure applied in one study while the number of times the activity is performed is the measure used in another investigation?

An analysis of this problem yields two subsidiary questions. For a given group of persons are the group ratings for frequency closely related to the number of persons who perform the activity? Are the group ratings for frequency by those who perform the activity closely related to the universality of performance?

The answer to the first question can be predicted in advance. Frequency is estimated on a scale measuring the number of times the ac-

[1] For example, universality is the criterion used in the following studies:
Charters, W. W., and Whitly, I. B. *An Analysis of Secretarial Duties and Traits.* Baltimore: Williams and Wilkins Co., 1924.
Struck, F. T. *Farm Shop Work in Pennsylvania,* Pennsylvania State College, School of Agriculture, Rural Life Dept., Bulletin, No. 1.
Fuller, L. D. "Manual Arts Based on Home Repair," *Journal of Educational Research,* March, 1921.

[2] For example, frequency is the criterion used in the following studies:
Wilson, G. M. *A Survey of the Social and Business Uses of Arithmetic,* New York: Teachers College, Columbia University, 1919.
Charters, W. W. *Curriculum Construction, Study 27, Department Store Arithmetic* (New York: Macmillan Co., 1923), pp. 231-236.
Cook, W. A., and O'Shea, M. V. *The Child and His Spelling.* Indianapolis: Bobbs-Merrill Co., 1914.

tivity is performed in a given period. On this basis, those who do not perform the activity give it a zero rating for frequency. Thus, if 20 persons from a group of 100 do not perform the activity its group frequency rating is lowered even though the other 80 persons perform the activity many times. For this reason, we can expect universality to be more or less closely related to group ratings of frequency.

Whether universality is closely related to the frequency with which an activity is performed by those who perform it is a question which cannot be so easily answered. If only 10 persons out of 100 perform an activity it receives a low rating for universality. Whether or not each of these ten persons perform the activity frequently cannot be predicted in advance. This is a phase of the question of the relationship between frequency and universality which must be answered from the results of actual investigations.

As a part of the Commonwealth Teacher Training Study, a large number of teachers rated a list of teaching activities with reference to frequency of performance. The individual ratings were combined by appropriate statistical methods[3] to form a score for each activity which represents the group rating for frequency of performance. Each teacher also indicated which activities he performed by placing a dash after those duties which he did not perform. This gives a measure of the universality of the performance of each activity at the same time that a measure of frequency is obtained.

The degree of relationship between the group ratings of frequency and universality of performance of teaching activities was determined by finding the coefficient of correlation between the frequency ratings and the number of persons performing each activity. This correlation coefficient was computed for two different groups of teachers, viz., a representative body of high-school teachers who were graduates of the University of Chicago and a group of teachers in the elementary schools of Chicago.

The relationship between the universality of performance and the frequency with which the activities are performed by those who perform them was determined in the following manner:

---

[3] Charters, W. W., and Waples, D. *Commonwealth Teacher Training Study* (Chicago: University of Chicago Press, 1929), pp. 251-253. For the validation of these methods consult Tyler, R. W. *Statistical Methods for Utilizing Personal Judgments to Evaluate Activities for Teacher-Training Curricula*, Ph.D. Thesis, University of Chicago, 1927.

Each of the group ratings for frequency was multiplied by the fraction—

$$\frac{\text{The total number of persons rating the activities}}{\text{The number of persons who perform this activity}}$$

In this way, ratings were obtained which represent the relative frequency with which each activity is performed by those who perform it. These new frequency ratings were then correlated with the number of persons who perform each activity. This technique was applied to the ratings obtained from the high-school teachers who were graduates of the University of Chicago.

From these comparisons several facts are revealed. It is found that group ratings for frequency of performance of teaching activities bring almost identical results with ratings for universality of performance. The coefficient of correlation between the two sets of ratings by high-school teachers is .983 ± .001; by elementary school teachers, .950 ± .003.

It is also found that there is a relationship, though not so marked, between universality of performance and the frequency with which activities are performed by those who perform them. The coefficient of correlation between these two sets of ratings by high-school teachers is .507 ± .021.

From these comparisons it is evident that the rating of teaching activities for universality could take the place of the rating of teaching activities for frequency in those studies of teachers' duties in which group frequency ratings are desired. It is much simpler to collect ratings for universality than for frequency, since it is easier for the teacher to record the fact that an activity *is* performed than to record how *often* it is performed. In studies where a frequency rating for only those who perform the activity is desired, the rating for universality could not be substituted.

## THE RELATION BETWEEN PHYSIQUE, INTELLIGENCE, AND PROFICIENCY IN SCHOOL SUBJECTS [1]

SIDNEY ADAMS
*University of Washington*

IT was the purpose of this study to measure the relation between the size of school children and their achievement in school subjects. As

[1] The writer wishes to thank Mr. Worth McClure, Assistant Superintendent of the Seattle public schools, together with the teachers and principals of the schools studied, for the coöperation that made this article possible.

developed in this study, the correlations obtained should indicate the influence of size on motivation or drive toward acquiring school material, since an effort was made to keep ability and opportunity to learn constant. This was done by keeping age relatively constant, by making separate studies of children of different school grades, and by holding intelligence constant by means of partial correlations.

## CONDITIONS

The study involved 290 children. It was completed between May, 1928 and March, 1929. For each child included in the study, three measures were obtained: measures of size (height and weight), intelligence, and achievement. The children studied were all enrolled in the Seattle public schools, and, with one exception, the measurements were obtained from the records kept by the schools, care being taken to preserve the anonymity of the pupils throughout the course of the study. The pupils studied were enrolled in three elementary and two junior high schools of the city. All school grades between the fifth and the eighth were represented. The following is a summary of the testing conditions at each of the schools:

School A: Fifty-nine pupils of the 8-A grade were studied. Thirty-three were boys, 26 girls. Physical measurements were taken by the author. Achievement was measured by the Stanford Achievement Test, form A. Intelligence was measured by the Otis Intermediate Test.

School B: Thirty-seven cases obtained from the 6-A grade. Fifteen boys were studied, along with 22 girls. Test records were obtained for the Stanford Achievement Test, form A; and the Otis Group Test, Intermediate.

School C: Records were obtained for 40 boys and 47 girls from the fifth A and B grade. The Stanford Achievement Test, form A, was used, together with the Illinois Intelligence Test, form 1.

School D: Thirteen boys and 15 girls of the 7-B grade were studied. They were given the Otis Intermediate Test, and the Stanford Achievement Test, form A.

School E: Seventy-nine cases studied from the fifth grade. These were comprised by 38 boys and 41 girls. The Illinois Intelligence Test, form 1, had been given along with the Stanford Achievement Test, form A.

## METHODS

It would, of course, have been desirable to have expressed the results of the study in a single correlation co-efficient, obtained through partialling the simple intercorrelations of size and achievement for intelligence, using all the cases. This was impossible because of the differences in age of the various groups, and because uniform intelligence scores were not obtainable throughout.

Two correlations were obtained for each school group, separate correlations being obtained for boys and girls. Where the number of cases exceeded 25 correlations were got by means of a scattergram using Pearson's product-moment coefficient formula, or by means of Ayres' modification of Pearson's formula. Where the number of cases were less than 25, a rank difference correlation was had, to be converted into a product-moment coefficient.

## RESULTS

The obtained results are given in the following table:

| *Group* | *Traits* | *Correlation* | *Probable Error of Corr.* |
|---|---|---|---|
| Boys, School A | Ht.–A. T. partialled for intelligence | –.281 | .107 |
| | Ht.–A. T. | –.268 | .109 |
| | Ht.–Intell. | –.099 | .115 |
| | A.T.–Intell. | .702 | .059 |
| Girls, School A | Ht.–A. T. partialled | .060 | .117 |
| | Ht.–A. T. | .271 | .122 |
| | Ht.–Intell. | .312 | .119 |
| | A.T.–Intell. | .747 | .058 |
| Boys, School E | Ht.–A.T. partialled | –.071 | .109 |
| | Ht.–A. T. | .148 | .107 |
| | Ht.–Intell. | .389 | .092 |
| | A.T.–Intell. | .524 | .080 |
| Girls, School E | Ht.–A. T. partialled | –.475 | .081 |
| | Ht.–A. T. | –.051 | .105 |
| | Ht.–Intell. | .688 | .060 |
| | A.T.–Intell. | .385 | .089 |
| Boys, School B | Ht.–A. T. partialled | .148 | .170 |
| | Ht.–A. T. | –.488 | .133 |
| | Ht.–Intell. | –.682 | .092 |
| | A.T.–Intell. | .814 | .058 |
| Girls, School B | Ht.–A. T. partialled | –.715 | .070 |
| | Ht.–A. T. | –.206 | .137 |
| | Ht.–Intell. | .343 | .126 |
| | A.T.–Intell. | .732 | .067 |
| Boys, School D | Ht.–A. T. partialled | –.495 | .141 |
| | Ht.–A. T. | –.420 | .153 |
| | Ht.–Intell. | –.088 | .186 |
| | A.T.–Intell. | .547 | .131 |
| Girls, School D | Ht.–A. T. partialled | .221 | .165 |
| | Ht.–A. T. | .339 | .153 |
| | Ht.–Intell. | .343 | .153 |
| | A.T.–Intell. | .446 | .121 |
| Boys, School C | Ht.–A. T. partialled | –.096 | .157 |
| | Ht.–A. T. | .041 | .106 |
| | Ht.–Intell. | .191 | .102 |
| | A.T.–Intell. | .607 | .067 |
| Girls, School C | Ht.–A. T. partialled | .046 | .099 |
| | Ht.–A. T. | .042 | .098 |
| | Ht.–Intell. | .003 | .098 |
| | A.T.–Intell. | .471 | .076 |

Though both height and weight were obtained from the records, height alone was used in making the correlations. Of the two measures that might have been taken, height was selected as being the least variable.

Measures of intelligence were sometimes obtained as test scores and sometimes as intelligence quotients. Since age was being held relatively constant through the selection of pupils within a single grade, it seemed necessary to use test scores or their equivalent in computing the correlations. If the results of intelligence testing were recorded in terms of the intelligence quotient, these quotients were re-converted to mental ages by multiplying the child's age at the time of testing to his intelligence quotient.

### CONCLUSIONS

1. A negative low correlation is found to exist between size and achievement when partialled for intelligence.

2. While this correlation is variable, it seems that it is of sufficient size to be of significance.

3. A study using a number of pooled physical traits rather than a single trait might give a more significant correlation.

## STUDENT LEADERSHIP IN ELEMENTARY AND JUNIOR HIGH SCHOOL, AND ITS TRANSFER INTO SENIOR HIGH SCHOOL

ISABELLE J. LEVI
*University of Cincinnati*

THE changes in American elementary and secondary education in the last twenty years have largely arisen out of new concepts of the aims of education. Training for civic, social, and moral responsibility is one of the most important of these new aims of education. An integral part of this general aim is training for leadership.

### THE PROBLEM

The purpose of this research was to investigate the following problems of leadership as exemplified in extra-curricular activities:

1. What is the relationship between the degree of leadership in extra-curricular activities and the age, scholarship, and other miscellaneous activities of leaders?

2. To what degree does leadership in extra-curricular activities carry over from one school to another? It thus concerns the transfer of

leadership from elementary to senior high school and from junior high school to senior high school. It attempts to discover the amount and kind of transfer from one institution to another.

Objective data of the following kinds were used in this study: the kinds of extra-curricular activities in elementary, junior high, and senior high schools, participated in such as dramatic club, school baseball team, etc.; the ages of student leaders; the school marks of these leaders; the kinds of outside organizations to which these leaders belonged; the kinds of private lessons in which these leaders were instructed; the number of hours of paid work of these leaders, etc.

Thirteen elementary and ten junior high schools in Cincinnati, Cleveland, and Columbus were first visited. These schools represented a wide range in communities and in enrolment. Principals or assistant principals and sponsors of activities were interviewed in order to obtain information about the extra-curricular activities available in these schools, the limitations as to the number and kind of activities in which boys and girls in the eighth and ninth grades might participate, and which students were the leaders in extra-curricular activities. The school marks and senior high-school destinations of each leader were obtained. These students were then followed into nine senior high schools where, through interviews with the principals or assistant principals of these schools, the quality of each student's leadership in extra-curricular activities was determined.

## RESULTS OF THE RESEARCH

The names of 230 leaders were obtained from the 13 elementary and from the 10 junior high schools. Of these 230 students, 210 were located in the 9 senior high schools and from this number 206 complete returns were received. Ratings of each activity were made through the study of point-systems of awards in use in many schools. Outside activities, scholarship, and paid work were also given ratings. Each leader's activities were weighted by dividing his activities by the total weight of all offered by his school. All activities were classified as athletic, civic-social, three-arts, and scientific-manual. Then the weighted values were arranged in 21 tables, and correlations necessary to answer the questions of the problem were calculated.

The chief facts brought out by this investigation were:

1. The correlation between school activities and age of elementary leaders is —.274 with PEr of .07.

2. The correlation between school activities and age of junior high-school leaders is —.0005.

3. The correlation between school activities and scholarship of junior high-school leaders is .259 with PEr of .07.

4. The correlation between school activities and scholarship of junior high-school leaders is .255 with PEr of .057.

5. The correlation between school activities and outside organizations of elementary leaders is .234 with PEr of .069.

6. The correlation between school activities and outside organizations of junior high-school leaders is .243 with PEr of .059.

7. The correlation between school activities and private lessons of elementary leaders is .003.

8. The correlation between school activities and private lessons of junior high-school leaders is .15 with PEr of .059.

9. The correlation between school activities and work of elementary leaders is —.151 with PEr of .072.

10. The correlation between school activities and work of junior high-school leaders is —.027 with PEr of .061.

11. The amount of carry-over of leadership in school activities from elementary to senior high schools is .172 with PEr of .027.

12. The amount of carry-over of leadership in school activities from junior high school to senior high school is .515 with PEr of .043.

13. The carry-over of number of school activities from elementary to senior high school is .188 with PEr of .07.

14. The carry-over of number of school activities from junior high to senior high school is .378 with PEr of .046.

15. The carry-over of athletic leadership from elementary to senior high school is —.167 with PEr of .143.

16. The carry-over of athletic leadership from junior high to senior high school is .442 with PEr of .066.

17. The carry-over of civic-social leadership from elementary to senior high school is 0.

18. The carry-over of civic-social leadership from junior high to senior high school is .176 with PEr of .071.

19. The carry-over of three-arts leadership from elementary to senior high school is .162 with PEr of .095.

20. The carry-over of three-arts leadership from junior high to senior high school is .229 with PEr of .078.

21. The carry-over of scientific-manual leadership from junior high to senior high school is .172 with PEr of .182.

22. The average age of the eighth grade elementary leader is 13 years, 10 months. (As of April 1.)

23. The average age of the ninth grade junior high-school leader is 14 years, 7 months.

24. The average scholarship of the elementary leader is above the grade fixed in this study as average.

25. The average scholarship of the junior high-school leader is the grade fixed in this study as average.

26. The average elementary leader does not take private lessons, does not work after school or on Saturday, and belongs to two organizations outside of school.

27. The average junior high-school leader does not take private lessons, does not work and belongs to three outside organizations.

28. The range in points of total activities offered by the thirteen elementary schools is from 8 to 46 in the case of boys, and from 4 to 40 in the case of girls.

29. The range in points of total activities offered by the ten junior high schools is from 18 to 90 in the case of boys, and from 18 to 86 in the case of girls.

30. The range in points of total activities offered by the nine senior high schools is from 71 to 160 for boys and from 45 to 132 for girls.

## SUMMARY

Based on these data, the following conclusions may be drawn:

1. The elementary and junior high-school leader, as far as age is concerned, is the average student of his grade. It appears, therefore, that participation in activities does not lead to retardation.

2. The correlation between school activities and the age of elementary leaders is a minus relationship. This means that there is a tendency to associate the lowest age with the greatest weight of activities. This study appears to show that the accelerant is a leader in activities.

3. This study shows the average scholarship of the elementary leader as above the limits 75 to 85 and the average scholarship of the junior high-school leader as within the range 75 to 85 or slightly better. Also, there is a tendency in both schools for scholarship to increase as the weight of activities increases. In the light of these findings, rules governing participation in activities may include scholarship require-

ments, that is, leaders in both schools may be expected to keep their scholarship up to average.

4. The relation between school activities and private lessons and between school activities and paid work is so small that the implication is that school leaders should not be encouraged to take private lessons nor to work for pay.

5. The relation between school activities of leaders and members in outside organizations is, relatively speaking, a close one. Other implications of the relationship between school activities and outside activities are:

a. The sponsor of school activities should use outside activities as a basis for creating interest in school activities.
b. The sponsor should in every way possible coöperate with the sponsors of outside activities.
c. The administrator should use outside activities as the basis for the program of extra-curricular activities in the school.
d. Teachers who are leaders in outside organizations should be encouraged to sponsor these activities in the school.

6. The carry-over of the leadership in school activities from junior high to senior high was found to be three times the carry-over from elementary to senior high. If transfer of leadership is a criterion of training for leadership, it seems that the elementary school is not performing its task as well as the junior high school. Two factors may contribute toward this result:

a. A well-organized program of extra-curricular activities in the junior high school.
b. A more efficient system of administering extra-curricular activities in the junior high school.

7. The results as to kinds of activities which carry over may be summed up as follows:

a. Athletic activities carry over from junior to senior high school to a marked degree; the carry-over from elementary school is zero. This appears to show that training in athletic leadership in junior high school is showing results.
b. Few senior high schools offer opportunities for participation in civic-social activities in the ninth grade. This accounts in part for the zero transfer of such activities.
c. No elementary schools offered any scientific-manual activities but those offered by the few junior high schools showed a fair transfer.

# EDITORIALS

## PLANNING THE YEAR'S PROGRAM

Fifteen million and more boys and girls have during this month started another year of school work. These children, their teachers, their parents, and their friends are anxious to make the year as profitable as possible. With these facts in mind administrative and supervisory officials are planning the year's work. The purpose of this editorial is to review briefly some of the most frequently noted needs of present day education:

1) A clearer understanding of the objectives of education. The school is an institution maintained by society to produce higher modes of living through education. It thus sets up certain goals to be achieved. If these goals are to be reached, teachers must be made conscious of them and strive to attain them.

2) A better selection, gradation, and organization of subject matter for teaching purposes. Much has been done during the last ten years toward the better selection of subject matter through scientific curriculum construction. The content of school courses is being rapidly revised to harmonize with present day needs. More attention needs now to be given to the grade placement of subject matter and its organization for teaching purposes.

3) More information is needed about the nature and direction of the learning process. The central problem of classroom instruction, following the determination of the objectives of education and the curriculum, is the direction of learning. The performance of the various activities of which the curriculum is composed calls forth different mental processes. If the teacher is to be most intelligent in her direction of learning she must know the mental processes involved in the performance of different activities of which the curriculum is composed.

4) Better means of providing for individual differences. The traditional lockstep method of instruction with the same curriculum for all is no longer considered adequate by leaders of education. Ability grouping, individual instruction, the differentiated assignment, and various supplementary devices are now being used to provide for individual differences. The central problem here seems to be that of securing a flexible attitude toward the different modes of providing for individual differences and a fuller comprehension of the fact itself as applied to the all around development of the child.

5) Recognition of the importance of the learner's attitude as a factor conditioning the learning process. This fact has been expressed by McMurry through the term *motivation*, by Kilpatrick through *purposeful activity*, by Dewey through *interest*, and by Thorndike through the *law of effect*. The attitude of the learner is an important factor in learning. More attention needs to be given to the psychology of interest and to methods of securing interest in school activities.

6) More attention needs to be given to the general welfare of school children. The schools are assuming more responsibility for the general welfare of pupils to-day than ever before: (a) through the establishment of medical inspection and health work; (b) through the establishment of psychological clinics and special classes for the mentally, morally, socially, and physically handicapped; and, (c) through plans of vocational guidance, placement, and follow-up.

7) The need for greater emphasis upon the social, emotional, and character aspects of education. The attention of the immediate past has been focused primarily upon the mastery of subject matter. More attention needs to be given to the human aspects of education such as those involved in the adjustment of the individual to social situations, the acquisition of attitudes, the emotional reactions of individuals, and character. Considerable new literature has appeared within the last two years upon these subjects.

8) The need for better means of measurement. Considerable progress has been made in the development of objective methods of measurement in the informational aspects of school subjects. More recently the attention of test constructors has been turned to the less tangible aspects of education with the result that many tests of the more fundamental aspects of education have been made available. These tests of the social, emotional, and cultural products of instruction need to be more generally used.

It is not amiss to reiterate in this connection the frequently made plea for better trained teachers. It is only through the employment of better trained teachers that the more technical aspects of education can be realized. Professional standards have been advanced during the last quarter of a century through the introduction of better methods in the institutional training of teachers. Not all of the training can, however, be of the institutional sort. More attention needs to be given to the training of teachers in service. There is probably no aspect of the school service which is less adequate than that of school supervision. The program outlined above is designed for the training of pupils. Something approaching an adequate program for the in-service training of teachers might be realized by similarly considering the means, methods, and materials of teaching teachers how to teach.

A. S. Barr.

# REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

EASTERN COMMERCIAL TEACHERS' ASSOCIATION, *Curriculum Making in Business Education* (New York: Eastern Commerical Teachers' Association, 1929), xx + 383 pp.

For those who realize the increasing grasp which commercial education is taking on the field of secondary schools and who feel the need of becoming acquainted with the best thought of the times concerning it, this book is extremely valuable. It contains statements of curriculum construction by well known commercial workers, including junior high schools, senior high schools, continuation schools, evening schools, business colleges, junior colleges, the collegiate school of business administration, normal schools, teachers colleges, and universities which train commercial teachers.

The first two sections, devoted respectively to prefaces and trends in American business and educational life, are probably the least valuable since they deal largely in generalities and theories. Of course, one unacquainted with the business education movement, as perhaps many administrators may be, may get a valuable background by further reading of these sections.

Beginning with the third section, the book contains specific recommendations for curricula in business education for each of the types of schools mentioned above. These definite proposals are accompanied by clear statements of theory and principles which should enable an administrator to adjust his own commercial curricula to the varying needs of his school, although this may make it difficult for him to adopt any one set of specific recommendations entirely.

The section on junior high schools clearly states a concept of the place of commercial education in that field which coördinates the more or less confused views that have been extant as was bound to be the case in a movement as new as this one. In this section Glass says "Each pupil makes three discoveries (through commercial work in the junior high school); first, of his aptitude for commercial work; second, of the educational opportunities for the training of aptitude; third, of the vocational openings for the useful employment of aptitude when discovered and trained." He recommends a required course for those elements of business which all adults need, and an elective course which provides specialized training for probable drop-outs in those business occupations for which young people of that age are eligible; and he also recommends, through the former course, vocational guidance in the field of business. This is a highly tenable position and states the best thought of the time concerning commercial education in junior high schools. The other sections contain equally valuable selections.

The book is organized so that the third section gives principles of curriculum construction for each phase of

commercial work and the following sections give typical case studies for each phase. It is almost encyclopedic in the way it covers the whole problem of curriculum construction in business education and should be read with care by everyone interested either directly or indirectly in education for business.

E. G. BLACKSTONE
*State University of Iowa*

BARTLETT, LESTER W., AND OTHERS. *The Y. M. C. A. Executive Secretary* (Chicago: University of Chicago Press, 1929), xiv + 104 pp.

The technique of activity analysis developed under the direction of Professor W. W. Charters is here applied to the executive secretaryship of the Young Men's Christian Association. The purposes served by the inquiry are principally those of throwing light on the problems of curriculum construction in training men for this profession, and of furnishing a schedule of activities useful for a check upon the efficiency of the secretary or for the guidance of those who may be charged with the responsibility of selecting men for such posts.

The results are summarized in seven tables which comprise almost two-thirds of the book, in which the activities are listed and ranked as to frequency of performance, importance, difficulty of learning, and need for organized school training. The method employed in constructing and rating the lists was that of observation of the activities of a limited number of secretaries and was supplemented by the use of a questionnaire that was answered by a much larger number. The tables are sufficiently simple in form to be readily understandable. The limitations of the method are frankly set forth and the work is not offered as furnishing a panacea for all problems which confront the profession. The work is of real value, however, to the educational world as an excellent illustration of a method of inquiry which may be fruitfully employed in discovering essential data for guidance in curriculum construction and personnel direction.

ARTHUR C. WICKENDEN
*Miami University*

GEE, WILSON (editor), *Research in the Social Sciences* (New York: Macmillin Company, 1929), 305 pp.

The year 1929 was a monumental epoch in the field of social research: *Social Research* by George A. Lunberg, *An Introduction to Social Research* by Howard W. Odum and Katharine Jocher, and the volume under review all appeared in what was then a field almost devoid of texts. Each has its peculiar merits and serves different needs. *Research in the Social Sciences* consists of a series of lectures delivered at the University of Virginia by outstanding authorities in the general fields of social science upon the initiation of the Institute for Research in the Social Sciences. Like all volumes of this type, it represents a great deal of overlapping and repetition, as well as conflicts, due to the stating and differentiating of viewpoints, problems, and fields from which data are gathered. It has, however, the advantage of presenting the specific viewpoint of eminent authorities in their own fields.

There are nine chapters: Sociology by R. E. Park; Economics by A. A. Young; Anthropology by Clark Wissler; Statistics by R. E. Chaddock; Psychology by R. S. Woodworth; Jurisprudence by Roscoe Pound; History by A. M. Schlesinger; Philosophy by John Dewey; and Political Science by C. A. Beard.

Park conceives of social research as beginning with the community and including the processes of civilization. The population pyramid exhibiting the deviations of age classes and sex groups has proved a useful device of social exploration. Mobility, migrations, all changes of location and status and commerce are immediately associated with social change, and therefore, deserve the attention of sociologists. The urban community presents a manifestation of tendencies inherent in the urban situation; its natural areas form a frame of reference for various types of studies. In studying social phenomena the sociologist has a special point of attack, a device for exploration in the life history of the individual. This shows the relation between the cultural life of the community and the personal life of the individuals who compose it.

Chaddock maintains that inductive processes and deductive processes should go hand in hand; statistical methods are essential tools which should be used to shape answers to specific questions. There is grave danger, however, "that progress in statistical technique of analysis and description will outstrip the perfecting of methods for obtaining more complete and reliable original data." (p. 146).

Woodworth takes the position that psychology, which he conceives of as a study of the individual, occupies a central position between the biological sciences and the social sciences. He is of the opinion that much valuable observation has been obtained by the introspective method. In fact, the person making a verbal report on the behavior of another individual is employing a subjective element even though not making the observation upon himself: "One observation is really as objective as the other, taken just by itself." (p. 159) The case history method, a very fertile type, starts with the effect and tries to judge the cause. The results, however, should be regarded more as hypotheses than as conclusions, since the method traces the process backward instead of following the development forward as in the case of the genetic method. The comparative method studies not cause and effect, but concomitants, or facts found together, and is generally applied through statistical correlations. All these methods may be used by social psychologists, although they may not apply to certain data, such as myths and folklore.

Pound points out that "Many causes, social, economic, and political, have contributed to require shifting of the emphasis from the abstract will of the abstract individual to concrete claims of concrete human beings." (p.189) The legal science of the present is characterized by the attitude of studying law in relation to and as a part of social control and its recognized interrelationships with the other social sciences. Research has shifted from historical investigations of positive legal institutions and positive legal precepts to the individual as a human being, and to administrative application to individual cases.

In short, this book affords an excellent opportunity for studying the historical development of research in the separate social sciences; the methods employed, with something of their limitations and possibilities; and the objectives selected and set up in the different fields. As such the little volume will find a hearty welcome among those interested in research.

WINNIE LEACH DUNCAN
*University of New Hampshire*

VAUGHAN, WILLIAM E. *A Study of the Articulation in English Between the High School and College.* New York: Teachers College, Columbia University.

The purpose of this thesis was an attempt to discover some of the causes of the lack of articulation between the English offered in the senior year of high school and that offered in the freshman year of college, with suggestions for improvement. The data were derived from catalogs, questionnaires, courses of study, magazines and educational journals, a survey, and a test. The procedure was careful and, within its definite but limited field, thorough.

The results, although they are appalling, surely come as no surprise to Southern teachers. The articulation between the two educational agencies is slight, so the author finds. The fundamentals for the study of literature are neglected in the high school; there is an overlapping of textbook materials; little training and practice in the use of the library are given in the senior high school; and but slight effort is being made to bring the high-school and college teachers together in an effort to smooth out the chaotic problems. These are only a few of the sixteen general conclusions.

The suggestions for improvement given in the last chapter seem very sound. Although they apply, in the study, only to teachers of seniors who are to enter college and to teachers of college freshman English, they are provocative enough for a more universal consideration. A few of them are listed below.

If the high schools, especially the last year, should stress the extensive rather than the intensive plan of reading, the time saved might be profitably devoted to training those expecting to enter college, along the lines of freshman English. This recommendation should, in no sense, be interpreted to mean that the entire high-school English course should be reorganized to suit college English requirements.

As seventy-five percent of the high schools and ninety percent of the colleges agree that much of the work in the so-called fundamentals now done in the college should be done in the lower school, it is suggested that joint committees of high-school and college officials work out definitely the type of instruction along these lines that can best be furthered by each of these educational agencies.

As both the high schools and colleges agree that a strong contributing cause to English deficiencies and failures is the lack of ability to read understandingly, to express ideas clearly and coherently, and to organize material, frequent practice in paraphrasing, precise writing, topic expansion, and outlining might be valuable in correcting these weaknesses.

A most valuable subject for further investigation would be the predictability of college success in English based on objective English tests, intelligence tests, class marks, and personality records throughout the four years of high school.

BERT ROLLER
*George Peabody College for Teachers*

WOOD, BEN D., AND FREEMAN, FRANK N. *Motion Pictures in the Classroom* (Boston: Houghton Mifflin Company, 1929), xv + 392 pp.

This is a detailed report of the visual instruction study made under the auspices of the Eastman Kodak Company by Doctors Ben D. Wood of Columbia and Frank N. Freeman of Chicago. The study was financed by the Eastman Company which has entered into the making of education-

al motion pictures on 16mm film. The Wood-Freeman report made a very favorable finding supporting the use of motion pictures in education. This is somewhat the reverse of Dr. Freeman's former report made some six years ago when he conducted a similar study financed at that time by the Commonwealth Fund. The report will be helpful to all those who are interested in educational studies and the technical procedure involved.

B. A. AUGHINBAUGH
*State of Ohio, Department of Education*

MURCHISON, CARL, EDITOR. *The Foundations of Experimental Psychology* (Worcester, Massachusetts: Clark University Press, 1929), x + 907 pp.

Without question this book can be placed among the outstanding psychological publications for the year 1929. It is a veritable psychologist's encyclopaedia, and yet its style permits more thorough and complete discussion than is characteristic of encyclopaedic organization. At the outset, the editor advances his purpose by stating that he desires to cover the whole gamut of ubiquitous problems in psychology worthy of experimental investigation.

After reviewing the experimental evidence relating to the doctrine of the inheritance of acquired characteristics and indicating the negative character of these results, T. H. Morgan, in the first chapter, "The Mechanism and Laws of Heredity," points out that the alliance between psychology and genetics must be sought elsewhere. The facts of Mendelian heredity are then presented. In conclusion, the suggestion is made that identical twins offer many possibilities for thorough study of the problems of heredity.

"The Study of Living Organisms" is the title of the next chapter written by W. J. Crozier. The major portion of this chapter is devoted to tropistic modes of behavior, their measurement and the results of such measurement. Crozier states that the purpose of this description is to get at an understanding of complex behavior through simpler types of behavior. While this discussion is excellent in itself, the manner in which it is detailed seems somewhat out of proportion to the other problems considered in the book, for it occupies approximately ten percent of the entire volume.

Alexander Fordes discusses "The Mechanism of Reaction" in the third chapter. He first traces the neuromuscular evolution and then shows the similarity of nerve and muscle. A consideration of the functions of the nervous system follows. The deduction is made "that no decisive evidence has been offered to prove that after-discharge, summation, inhibition, and other reflex functions reveal anything which cannot be interpreted in physical terms."

The next two chapters deal with vision. Under the title of "Visual Phenomena and their Stimulus Correlations," L. T. Troland describes visual phenomena from a purely introspective standpoint and shows the correlations between the subjective phenomena and the accompanying physical or physiological factors. In discussing "The Nature of the Photoreceptor Process," Selig Hecht follows his proposal "to describe what appear to be the fundamental properties of the receptor process, to study the data pertaining to them, and then to see whether it is possible to suggest a type of physico-chemical organization in terms of which these properties find a rational expression." Chapters six and seven are concerned with hearing. In the first of these, H. Banister considers sounds, tones, compound tones and noise, beats, combination tones, con-

sonance, dissonance, auditory preception of space, speech and deafness, and fatigue. Following this discussion, H. Hartridge and H. Banister are concerned with the anatomy of the ear and various theories of hearing. After surveying the available evidence, these authors seem to favor the resonance hypothesis as an explanation of hearing. The four chapters which deal with vision and hearing occupy approximately one-fifth of the book which, relatively speaking, appears to be an overemphasis of these problems.

Chapter eight by Parker and Crozier is restricted to a discussion of "The Chemical Senses." Specifically, the facts in regard to olfaction, the common chemical sense, and taste are meticuously reviewed. J. P. Nafe considers "The Sense of Feeling" in the chapter that follows. Through an excellent consideration of the experimental evidence he evaluates the quantitative and qualitative theories of feeling. "The facts," he states, "fail to substantiate the qualitative theory involving, as it does, specificity of receptors and cortical areas." In the remaining portion of the chapter, localization and other learned responses, skin sensitivity, kinaesthesis, and visual sensitivity are summarily treated with reference to the problem of feeling. At the end of the following chapter on "Space and Non-Auditory Labyrinth," J. O. Holsopple quite adequately characterizes his treatment of the subject by stating that "an attempt has been made to provide a basis for understanding the problems of the vestibule rather than to compile a handbook or encyclopaedia of information." W. B. Cannon follows with a consideration of "Hunger and Thirst" in which he critically examines, in the light of the experimental evidence, the nature and basis of hunger and of thirst.

Two chapters on Emotion seem logically subsequent to the foregoing. In the first of these, Philip Bard describes "The Neuro-Humoral Basis of Emotional Reactions." He clearly shows the inadequacy of the James-Lange theory of emotions when scrutinized under the scope of experimentally derived facts. In concluding, this contributor points out that the theory proposed by Dana and Cannon is unlike the James-Lange theory in that it has much experimental support. This theory holds that "emotion results from the action and reaction of the cerebral cortex and the diencephalon." A caution is further extended to the effect that "the greatest service of this new theory is to divert the experimental study of the emotions from the periphery to the brain." After Carney Landis reviews "The Expression of Emotion" in the next chapter, he urges a closer *liaison* between psychology and physiology in the future study of emotions.

The experimental evidence in relation to the problems of learning is surveyed in chapters fourteen and fifteen. In the former K. S. Lashley discusses "Nervous Mechanisms in Learning." After evaluating a number of theories of learning in a background of the experimental findings which have accrued from his work as well as that of others, Lashley is doubtful as to whether anything more is known about the nervous mechanisms involved in learning than that which Descartes knew. He further specifies that the "sole value of an hypothesis is to define alternative possibilities which can be tested by experiment. W. S. Hunter follows with a well-organized review of "Experimental Studies" in learning.

The next six sections are somewhat less technical but no less adequate, therefore, than the preceding chapters. Arnold Gesell under the title, "The Individual in Infancy," considers extensively the

various means that are available for the study of infants. The individual in school is discussed from the standpoint of "General Ability" by Rudolph Pintner. This discussion entails an account of the development of intelligence tests, the available tools for the measurement of intelligence, the uses and results of intelligence testing and the concept of general intelligence. F. N. Freeman follows with a discussion of "Special Abilities and their Measurement," in which he enumerates the problems involved in the construction and use of educational tests. "The Adult in the Community" by Mark May and "The Conflict and Survival of Cultures" by Clark Wissler are two chapters fertile with possible leads for investigating problems in social psychology. A general survey of abnormal psychology, with few suggestions, however, for investigating the problems involved, is presented by S. I. Franz in chapter twenty-one.

The last two chapters by Kelley and Shen contain a clear and straight-forward account of "General Statistical Principles" and "The Statistical Treatment of Certain Typical Problems."

In view of the editor's comment in the preface, this all-too-sketchy review of a volume, replete with information and critical analyses, would indeed be ill-planned without a consideration of the nature of those problems which have been omitted. The reviewer, therefore, sought to ascertain a catalog of omitted psychological problems by checking those included in "Topics in Psychology."[1] Since this list of topics was prepared with the aid of fifty-one psychological books, it quite adequately represents a survey of problems in psychology that have been treated. The chief omissions in "The Foundations of Experimental Psychology" were found to be the problems relating to consciousness such as the general consideration, the degrees, the theories, and the definitions of consciousness. Furthermore, problems of moods, sentiments, attention, thought, and imagery are classified as "promising little return from experimental effort." Instincts are barely mentioned, while the "self" and the problems relating to character receive no consideration. For those who are willing to omit these problems from the field of experimental endeavors, the book is the most complete psychological treatise that has been issued from the press within recent years. The references to almost fifteen hundred titles throughout the volume greatly enhance its usefulness.

ALVIN C. EURICH
*University of Minnesota*

[1] Haggerty, M. E. *Topics in Psychology*. University of Minnesota Press, 1929.

# RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

ALTHAUS, CARL B. "The Trend of School Taxes in Kansas," *Bulletin of the University of Kansas*, XXXI (April, 1930), 35 pp.

A bulletin discussing the trend of school taxes in Kansas, the increase in taxes for school purposes, the causes for the increase, and the ability of the people of Kansas to support schools.

BRIGHT, IRA J. *A Study of the Correlation Obtaining between Academic and Citizenship Grades and between Academic Grades and Intelligence Quotients* (Leavenworth, Kansas: Leavenworth Public Schools, 1930), 17 pp.

The author concludes that there is a high correlation between ability in the academic subjects and intelligence, and that there is a comparatively high correlation between citizenship and scholarship.

PLENZKE, O. H., AND DOUDNA, EDGAR A. *The Training and Work of High-School Teachers in Wisconsin in New Positions* (Madison, Wisconsin: State Department of Public Instruction, 1930), 16 pp.

A survey of the training, experience, teaching schedules, and extra-curricular activities for teachers in new positions in the state of Wisconsin.

*Report of Study of Possibilities of Employment of Handicapped Persons in Minneapolis, Minnesota* (Washington: Federal Board for Vocational Education, Bulletin No. 146, June, 1930), 80 pp.

This bulletin contains a statement of the problem, the objectives, scope, organization, operation, control, and findings of the survey.

TYSON, LEVERING. *Education Tunes In:* A Study of Radio Broadcasting in Adult Education (New York: American Association for Adult Education, 1930), 119 pp.

A general survey of educational broadcasting in this country, with suggestions as to needed industrial and educational changes.

WEIDEMANN, C. C. "A New Type Letter of Recommendation for Teachers," *University of Nebraska Publication*, No. 66 (December, 1929), 67-71, 74-95.

An analysis of the content of 1,250 letters of recommendation written for teachers, with suggestions for the improvement of such letters.

### EDUCATIONAL ADMINISTRATION AND SUPERVISION

BUTLER, FRANK A. "Standard Items to Observe for the Improvement of Teaching in Classroom Management," *Educational Method*, IX (June, 1930), 517-527.

An article presenting an improved method of observing classroom teaching,

in which an attempt has been made to validate the items of observation.

KNIGHT, JAMES, AND MANUEL, H. T. "Age of School Entrance and Subsequent School Record," *School and Society*, XXXII (July 5, 1930), 24-26.

A study of subsequent school records of 114 children, 6 entering the first grade at the age of 5, 62 at the age of 6, 41 at the age of 7, and 5 at the age of 8. The author finds that, on the average, those who started at an earlier age did as well as or better than those who started later.

PSYCHOLOGY OF LEARNING

CARR, HARVEY. "Teaching and Learning," *Journal of Genetic Psychology*, XXXVII (June, 1930), 189-219.

A laboratory study with certain theoretical considerations in teaching and learning.

KAULFERS, WALTER VINCENT. "Effect of Mental Age on Foreign Language Achievement," *Journal of Applied Psychology*, XIV (June, 1930), 257-268.

The author finds that achievement in Spanish is conditioned by general intelligence; that intelligence is a more effective conditioning factor in composite activities involving the complex responses of perception, association, and recall, than in simple processes, such as vocabulary building; and that the M. A. rather than the I Q should be taken as the basis for grouping beginning foreign language students.

EXPERIMENTAL STUDIES OF TEACHING

CRAWFORD, C. C., AND HAMREN, L. H. "An Experiment with the Use of Printed Study Guides," *Educational Method*, IX (June, 1930), 541-544.

A comparative study of three methods employed for the improvement of the study habits of high-school pupils, namely, (1) courses in how to study, (2) the usual program of supervised study, and (3) printed or mimeographed study guides. The experiment was of the rotation type involving two twelfth-grade classes. The author concludes in favor of study guides.

KOCH, H. L. "Some Factors Affecting the Relative Efficiency of Certain Modes of Presenting Material for Memorizing," *American Journal of Psychology*, XLII (July, 1930), 370-388.

A study of the relative effectiveness of the presentation of materials through the different sense-avenues or combinations of sense-avenues. The simultaneous combination of the visual and auditory presentation was, according to the measures applied, uniformly superior, the simple auditory presentation being uniformly inferior.

TURNER, OLIVE G. "The Comparative Legibility and Speed of Manuscript and Cursive Handwriting," *Elementary School Journal*, XXX (June, 1930), 780-786.

In legibility, manuscript writing has a significant margin of superiority over cursive writing. In rate manuscript, writing exceeded the norms established for the grades studied, with one exception.

WEAVER, ROBERT B. "Formal and Informal Instruction in United States History in the Seventh Grade," *Elementary School Journal*, XXX (June, 1930), 755-765.

It appears from the data assembled that pupils of superior ability may waste

their time on exercises which are effective in improving the work of average and near-problem pupils. The formal method of instruction is of value in the case of pupils in the low and middle thirds and is of practically no value in the case of pupils in the high third.

WINCH, W. H. "Dates versus Centuries in Teaching Chronology to School Children (Part II)," *Forum of Education*, VIII (June, 1930), 120-129.

The author concludes that a much greater aggregate of chronological knowledge is obtained by teaching dates rather than centuries.

CURRICULUM RESEARCH

HATHAWAY, GLADYS M. "Vocabulary Difficulties in a Fourth Grade History Test," *University of Pittsburgh School of Education Journal*, V (June, 1930), 116-123.

The author shows that there is marked vocabulary difficulty in the textual materials of fourth grade history, and that such difficulties are a recurring source of error in the understanding of historical materials.

STATISTICS

DUNLAP, J. W., AND CURETON, E. E. "The Correlation Corrected for Attenuation in One Variable and Its Standard Error," *American Journal of Psychology*, XLII (July, 1930), 370-388.

The development of formulae for correlation corrected for attenuation in one variable and its standard error.

TREMMEL, E. E., AND WEIDEMANN, C. C. "A Machine Method of Calculating the Pearson Correlation Coefficient," *University of Nebraska Publication*, No. 72 (June, 1930), 15 pp.

The author presents a formula that may be advantageously used with the Monroe Adding-Calculator Model KAS-203 or KAS-203-13. The different steps used in making the calculation are numerated and illustrated.

WEIDEMANN, CHARLES C. "Square Root to Two Decimal Places of Accuracy by Additive Interpolation over Graduated Number Ranges," Supplement to *University of Nebraska Publication*, No. 72 (June, 1930), 8 pp.

A table of square roots for numbers from 0.01 to 100,000.

TESTS AND MEASUREMENTS

RILEY, GORDON L. "A Comparison of the P C and I Q," *The Psychological Clinic*, XVIII (February, 1930), 261-265.

A statistical treatment of the P C and I Q from which the author concludes that the P C is superior to the I Q as an instrument of prediction for superior or subnormal children.

SCUDDER, CHARLES R., AND RAUBENHEIMER, A. S. "Are Standardized Mechanical Aptitudes Tests Valid?" *Journal of Juvenile Research*, XIV (April, 1930), 120-123.

A study of eight well-known standardized tests of mechanical aptitude from which the author concludes that most of them are without validity, only 10 of 36 correlations having coefficients that exceed three times their probable error.

MISCELLANEOUS

DASHIELL, J. F. "Personality Traits and the Different Professions," *Journal of Applied Psychology*, XIV (June, 1930), 197-201.

The author presents a ranking of 12 traits for five different professions, and the intercorrelations among these.

WHITNEY, FREDERICK L., AND FRASIER, CLARK M. "The Relation of Intelligence to Student Teaching Success," *Peabody Journal of Education*, VIII (July, 1930), 3-6.

The authors conclude that there is little relationship between intelligence as measured by the average intelligence test and success in student teaching.

NEW TESTS

ALMY, H. C., AND SORENSON, HERBERT. *Almy-Sorenson Rating Scale for Teachers.* Bloomington, Illinois: Public School Publishing Company, 1930.

A ten point graphic rating scale for twenty teacher traits considered essential for successful teaching.

LEE, J. MURRAY. *Lee Test of Algebraic Ability.* Bloomington, Illinois: Public School Publishing Company, 1930.

A new test for predicting pupil success in algebra, with manual, score sheets, answers, etc.

PERSING, K. M. *Persing Laboratory Chemistry Test.* Bloomington, Illinois: Public School Publishing Company, 1930.

A new laboratory chemistry test, given in two forms, testing the students' knowledge of laboratory techniques.

PRESSON, JOHN M., AND KING, LE ROY A. *Presson Biology Test.* Yonkers-on-Hudson, New York: World Book Company, 1930.

There are two separate tests: Test 1 covering plant biology, and Test 2 dealing with animal and human biology.

SANGREN, PAUL V. *Sangren Information Tests for Young Children.* Yonkers-on-Hudson, New York: World Book Company, 1930.

This is an individual examination intended for use with children between the ages of five and seven.

# RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

*Request for coöperation.*—The Board of Editors and publishers of the *Journal of Educational Research* wish to enlarge the scope and increase the usefulness of the department of "Research News and Communications." The extension of this service is possible only through the coöperation of the large number of research workers and organizations throughout the country. Requests for coöperation have already been sent to more than five hundred research bureaus, state departments of education, graduate departments of education in universities, and educational associations and professional groups interested in research. The reader can aid in this work by marking his calendar so as to report at intervals of from one to two months significant research projects in which his institution or organization is interested. Of especial importance are: yearbooks in progress or near completion; school surveys and testing programs; school and laboratory experiments; curriculm studies and reorganizations; research abstracts, summaries, and bibliographies; and other significant factual investigations.

Due to the large number of Masters' theses in education and the limited space available it will not be possible to report such studies. It is hoped, however, to list in the January issue of the journal the Doctors' theses which are well under way. This service will be supplementary to that hitherto performed by the Bureau of Educational Research of the University of Illinois in listing the completed Doctors' and Masters' theses in education. The task of compiling the titles of completed graduate theses in education has recently been taken over by the United States Office of Education and these titles may be found in the annual bibliography of educational research issued at Washington. The *Journal of Educational Research* can perform an additional service by making known to students of education and research workers the thesis problems and other investigations on which individuals are currently engaged. The possibilities for avoidance of duplication and for coöperation in research are numerous and significant.

The reader will render a distinct service to the profession in calling to the attention of the editor significant studies under way or recently completed. Progress reports at appropriate intervals on long-term studies are of interest. If available a printed, mimeographed, or typed copy of the investigation reported will be appreciated. Please keep the description of a given study within three hundred words and follow approximately the form given below, addressing all communications to the editor of this department.

Investigator .....
Sponsoring organization .....
Problem .....
Scope .....
Techniques of investigation employed...

Final or tentative conclusions .....
When and where available .....
In what form available .....

*The Institute for Advanced Study.*—A new institution intended exclusively for graduate work, the first of its kind to be established in the United States, is provided with an initial endowment of five million dollars by Louis Bamberger and Mrs. Felix Fuld. The Institute for Advanced Study will provide facilities with which eminent men of learning may devote themselves to research and to the training of advanced students for and beyond the degree of Doctor of Philosophy or other professional degrees of equal standing. Dr. Abraham Flexner, formerly Secretary and Director of the Division of Medical Education of the General Education Board, will serve as the first Director of the Institute. He has undertaken the task of recruiting eminent workers as members of the staff. The institution will be located in Newark, New Jersey, or its vicinity. While plans for permanent buildings and equipment are being developed and staff selection and organization are being completed temporary quarters will probably be occupied. No doubt the member of the Board of Trustees best known in the field of education is President Frank Aydelotte of Swarthmore College.

*National Committee on Research in Secondary Education.*—This organization was started in June, 1925, for the purpose of initiating, directing, and coördinating research in secondary education and is made up of one representative from each of the various professional groups interested in secondary education. The chairman of the Committee is Dean J. B. Edmonson of the University of Michigan, and the secretary is C. A. Jessen of the Office of Education. Its personnel now includes delegated representatives from seventeen coöperating organizations and twenty-three members at large. Among the projects which the Committee has sponsored are: a statement of research procedure, bibliographies of research completed and under way, a number of special studies of problems in secondary education, a series of articles in *School Life*, and assistance in various ways to the United States Office of Education in dealing with problems of secondary education. During the current year the policy of the Committee has been to leave its membership free for such service as may be requested of individual members in connection with the National Survey of Secondary Education. At the time this is written seventeen members of the National Committee have been appointed to important committee positions in the work of the Survey. It is becoming increasingly apparent that the National Survey of Secondary Education will, during the next two years, claim the time and services of the membership and will at the same time perform many of the functions of the National Committee on Research in Secondary Education.

*Progress report on the National Survey of Secondary Education.*—This survey for which Congress appropriated $225,000 is under the direction of the United States Office of Education with Dr. Leonard V. Koos of the University of Chicago as associate director. The study will extend over approximately two more years. The several investigations planned include:

1. Junior high-school reorganization, F. T. Spaulding, Harvard University.
2. Horizontal organization of secondary education and the secondary-

school population, G. N. Kefauver, Columbia University.

3. School district organization for the administration and supervision of secondary education, Fred Engelhardt, University of Minnesota.
4. Special problems in reorganization, W. M. Proctor, Stanford University.
5. Characteristics of small high schools, W. H. Gaumnitz, Office of Education.
6. Study of unselected secondary schools in smaller communities and rural areas, E. N. Ferriss, Cornell University.
7. Guidance, W. C. Reavis, University of Chicago.
8. Administrative and supervisory staff, Fred Engelhardt.
9. Practices in the selection and appointment of teachers, W. S. Deffenbaugh, Office of Education.
10. Provisions for individual differences; marks and marking systems; plans for promotion of pupils, R. O. Billett, Ohio State University.
11. School publicity, Belmont Farley, National Education Association.
12. Curriculum, E. S. Lide, full time worker on the survey.
13. Extra-curriculum activities, W. C. Reavis.

Other investigations are yet to be definitely assigned to the present staff of the Office of Education or of the Survey, or are awaiting completion of studies conducted by other agencies.

*National survey of teacher training.*—Congress has authorized a three-year program for a survey of teacher training which began July 1, 1930. The authorization stipulated that the total cost should not exceed $200,000. Direction of the survey is under the Office of Education with Dr. E. S. Evenden of Columbia University as associate director and an eminent advisory group. It is hoped to announce in this department in the near future the details of the study.

*Science teaching in the North Central Association.*—A comprehensive survey of science teaching in seventeen hundred high schools, including seven thousand science teachers, is being conducted by Dr. F. D. Curtis of the University of Michigan. It is expected that a report of the study will be available by the first of the new year.

*Summary of investigations in the teaching of science.*—A second volume summarizing studies of the teaching of science has been prepared by Dr. F. D. Curtis and will be available after the first of the new year from the press of P. Blakiston's Son and Co. The first digest of research in this field appeared in 1926, issued by the same publisher.

*Aid to libraries in liberal-arts colleges.*—The Carnegie Corporation of New York has appropriated for the present year $425,000 to enable certain widely distributed liberal-arts colleges to improve the effectiveness of their libraries in undergraduate teaching. The Corporation is thus carrying on what has become almost a tradition in American life. Andrew Carnegie personally, and later through the Corporation which he set up in 1911, distributed some $50,000,000 in erecting free public library buildings in the United States. In addition, the sum of $4,000,000 was spent in erecting college library buildings. In recent years the Corporation has devoted large sums to improvement of professional training for librarianship and to the extension and

improvement of library service throughout the country, aiming largely to raise standards of library work and professional morale rather than to bestow grants on individual libraries either for building or books. Two years ago the Trustees of the Corporation, in a review of their activities, decided that aid should be offered to a selected number of colleges where, under modern methods of instruction which seek to acquaint the students with books rather than with textbooks, the libraries were being subjected to demands from students and professors beyond the limits of the annual college budget. To determine library needs and opportunities the Corporation called upon certain persons interested in college library problems and asked them to make a survey of the situation. The activites of this group have resulted in a careful study of the problems of college libraries as distinguished from those of professional and technical schools, and upon this investigation the grants have been based. Previous grants in the same field have been made by the Corporation during the past five years. The program as a whole, it is believed, will enable colleges more adequately to meet the great demands for books for general undergraduate reading purposes.

*Next yearbook of the National Society for the Study of Education.*—The usual yearbook of the Society will be published in February, 1931, in two parts dealing with the problems of the textbook and rural education. The part about the textbook has been prepared by a committee of which Dean J. B. Edmonson of the University of Michigan is chairman. It comprises approximately 325 pages and includes a treatment of techniques of authors in preparing textbooks, policies of textbook publishers, selection of textbooks for use in schools, typography of textbooks, legislation affecting the use of textbooks, and a discussion of experiments in state printing of textbooks. The part of the yearbook devoted to rural education will include approximately 300 pages prepared by a committee under the chairmanship of Dr. O. G. Brim of Ohio State University. It is hoped to announce at a later date in this department the contents of this part of the yearbook.

*Fourthcoming yearbooks on supervision.*—The Department of Supervisors and Directors of Instruction has projected a series of yearbooks over a period of years. The next (fourth) yearbook, to be issued in January, 1931, is entitled, "The Evaluation of Supervisory Activities," and is being prepared under the chairmanship of Dr. Clifford Woody of the University of Michigan. Succeeding yearbooks and chairmen of committees are as follows:

"Capitalizing the Creative Energies of the Teacher," Miss Elma Neal, Assistant Superintendent of Schools, San Antonio, Texas.

"Differentiating and Unifying Supervisory Activities," Rudolph Lindquist, Oakland, California.

"The Application of Scientific Method in the Planning of Supervisory Programs," P. T. Rankin, Public Schools, Detroit, Michigan.

*Nation-wide experimental study of English usage.*—Previous studies relating to the teaching of English usage indicate possibilities for more effective and time-saving methods in this field. For this reason the Psychological Corporation is sponsoring a nation-wide experimental study in which the school systems of each state are invited to participate. The investigation will be directed by Dr. L. J.

O'Rourke, who has devoted a number of years to research in this field. A committee of the Psychological Corporation will collaborate in preparation of the final report which will be made available through the coöperation of the United States Office of Education. A series of three specially prepared diagnostic tests covering Grades VI to XII inclusive will be made available in October, 1930, for use in schools desiring to coöperate in the survey. The tests include one hundred items covering one hundred phases of English usage which have been found to present major difficulties. In April, 1931, a second series of tests will be available to measure the effects of remedial instruction during the year. It is expected that the results of the study will provide information concerning phases of usage which should have been mastered in preceding grades, which should be mastered in the given grade for which the teacher is responsible, and will provide a basis for more objective and practical allotment of phases of usage for instruction in the various grades, as well as a better understanding of methods of instruction necessary for mastery of various forms of English usage.

*New Director of College Education in the General Education Board.*— David H. Stevens, formerly Professor of English and Associate Dean of the Faculty of the University of Chicago, has been appointed Director of College Education in the General Education Board of New York. For six months before permanent appointment to this position Dean Stevens had been engaged in this work while on leave from the university. It is one of the most important posts with the Rockefeller group of educational foundations, since the Director of College Education is called upon to study the work of the colleges and universities of the country and to make recommendations for their financial assistance by the General Education Board.

*Annual report of the Carnegie Foundation for the Advancement of Teaching.*—With a total expenditure of more than $18,817,000 in retiring allowances and pensions up to June 30, 1929, the allowances of the Carnegie Foundation for the Advancement of Teaching, which have been paid without cost to recipients, have formed the most generous nongovernmental pension system ever operated for a professional group. On the same date the resources of the Foundation totaled $32,210,000. The annual report includes detailed information concerning retiring allowances, pensions and insurance, the Pennsylvania study of articulation between secondary and higher education, certain problems of dental and legal education, and American college athletics. Public interest in the study of college athletics has been especially keen. The Foundation has presented its studies of athletics in three bulletins: No. 18, *Games and Sports in British Schools and Universities;* No. 23, *American College Athletics;* and No. 24, *The Literature of American School and College Athletics,* by W. C. Ryan of Swarthmore College. Copies of these publications may be secured from the Foundation without cost.

*Secondary and higher education in Pennsylvania.*—The Carnegie Foundation for the Advancement of Teaching is coöperating with the Pennsylvania Department of Public Instruction and some fifty educational institutions of the state in a study of the relationships of secondary schools and colleges. This work is not a "survey" but an effort on the part of the institutions themselves to devise and apply certain practical procedures for transforming mass education

into individual education and for enabling the student to make use of his own abilities and educational achievements. At present the commission in charge is seeking to shed light upon the problem of articulation between the secondary school and the college. Each year in Pennsylvania more than a thousand pupils graduate from high school and enter college, only to drop out in the first semester after about four months of attendance on what should have been a four-year course. The attempt is being made for the first time to ascertain on a statewide basis the causes of this economic and educational waste and to discover means of reducing it. Two progress reports have been issued as bulletins of the Foundation at New York City.

*Research and the American Council on Education.*—The American Council on Education is made up of twenty-five constituent members such as the Association of American Colleges, the National Education Association, and the North Central Association of Colleges and Secondary Schools; twenty-one associate members such as the American Association for the Advancement of Science, the American Historical Association, and the National Society of College Teachers of Education; and numerous institutional members (colleges and universities). Its official publication is the *Educational Record*, issued quarterly. The Executive Committee of the Council has organized a Committee on Educational Problems and Plans as a promising enlargement of the Council's activities for the purpose of formulating a comprehensive program of educational investigation, which may prove as broad as American education itself. The Julius Rosenwald Fund has promised financial assistance in making possible the meetings of the committee over a period of from three to five years. A fuller statement of the contemplated program of research, prepared by Dr. C. H. Judd, chairman of the Council, may be found in the *Educational Record* for July, 1930.

*Research and the National Advisory Committee on Education.*—In April, 1929, President Hoover with the active coöperation of Secretary Wilbur of the Department of the Interior appointed a national committee to consider the activities of the federal government in the field of education, and to recommend the principles and policies which should control their determination and execution. This committee now consists of fifty-two members selected from the major organizations, agencies, and movements interested in American educational policy. In November, 1929, the Julius Rosenwald Fund placed at the disposal of the committee the sum of $100,000 to carry on the study, which has been under way since that date under the direction of Dr. Henry Suzzallo. Since every office of the federal government affects education to some extent, it obviously was necessary to limit the investigation to those governmental activities which have education as their major responsibility, namely:

1. Training employees of the government to insure better functioning of the government itself, either in special schools such as the naval and military academies or otherwise.

2. Conducting research and disseminating knowledge for the general welfare.

3. Assuring educational opportunities for residents of political dependencies, including the District of Columbia, Hawaii, Alaska, Philippines, etc.

4. Appropriate and effective training of native peoples, wards of the federal government, that is, Indians, Esquimaux, Aleuts.

5. Coöperating with the states in the conduct of local education.

Nine major problems involved in the investigation are:

1. Under our theory and practice of popular sovereignty has the federal government an obligation to aid education in the states?

2. Shall this aid be financial? To what extent? By what methods?

3. Shall federal aid take the form of general educational grants to the states for their own allocation? Or, the form of special grants for particular types of education?

4. Shall the states be compelled to match federal grants, general or special, with local appropriations?

5. Shall these grants be so conditioned that the federal government may inspect and ultimately control both the social policy and the professional procedure of public schools in the forty-eight states?

6. Or shall the federal government rely more largely on intellectual assistance (research, collection and dissemination of educational information, local conferences) to local public and professional opinion to improve educational policy and procedure in the interest of the national welfare?

7. Can intellectual assistance by federal government agencies, adequately set up, be in the long run as effective in stimulating new needed types of education as conditional money grants?

8. What will be the effect of the single or combined use of financial aid, intellectual assistance, and supervision upon the ultimate educational policy of our public schools?

9. What will be the effect on our social civilization and our governmental functioning? On the whole is democratic theory of personal and local responsibility necessary to our kind of national life?

A fuller statement of the study of federal relations to education may be found in a bulletin, *Federal Relations to Education*, issued by the National Advisory Committee on Education from 26 Jackson Place, Washington, D. C., and in the *Educational Record* for April and July, 1930.

In addition to the fifty-two members of the Committee, thirty-two federal representatives responsible for the educational activities of the government, sixteen national associations, an office and field staff of specialists, and ninety-three special and regional consultants and research workers are engaged in the study. The relation of the American Council on Education to the National Advisory Committee on Education is evidenced by the fact that the Director of the Council, C. R. Mann, is chairman of the Advisory Committee.

*International fellowships administered by the Institute of International Education.*—At the present time more than ten thousand foreign students are in our colleges and universities, while some five thousand American students are studying in foreign universities. To enable students of limited financial means to participate in study in another country the device of the exchange fellowship has been adopted, that is, in exchange for fellowships covering tuition, board, and lodging for foreign students in the institutions of the United States similar fellowships are granted for American students in foreign universities. The Institute of International Education since 1920 has increased its activities in this field from zero to the administration of nearly three hundred fellowships in 1930. A recent study, Bulletin No. 2, 1930, of the Institute at New York City is an attempted evaluation of the exchange fellowship based on an inquiry addressed to both foreign and American fellows administered by the Institute in the ten-year period. The report is highly favorable to the system of exchange fellowships.

*Curriculum-Making in Tulsa.*—Twenty-one members of the Tulsa, Oklahoma, public schools, including the associate superintendent in charge of curriculum, the assistant superintendent in charge of elementary education, two principals, the director of mathematics, and sixteen teachers, all members of the mathematics committee of that school system, spent a term of six weeks at the University of Iowa on curriculum construction under the direction of Dr. F. B. Knight. This group prepared for its summer work during the winter by holding a series of conferences and by studying the available literature, research, teaching materials, and courses of study in this field. With this preliminary work out of the way the committee organized its curriculum materials in tentative form during the summer session. Each member of the group registered for four hours of curriculum work and for two hours of elective work. The committee worked two-thirds of the available time on the Tulsa mathematics curriculum. They were on the same monthly salary as if they had been teaching in the summer school at Tulsa. In addition to the instructor, Iowa State University provided office quarters for the use of the workers.

This is a variation from the customary practice of having the curriculum committee work in its own city under the distant direction of an expert who makes occasional visits to the location in question. The plan provides daily conferences with the expert, the complete library and research facilities of a college of education, and an atmosphere of study and research at a time of the year when the work does not have to compete for time and attention with the general routine duties of school operation. The cost does not exceed that required when teachers are assigned to part or full-time work on course of study writing during the regular school year.

*Stated purposes of 404 junior colleges.*—A critical study of the stated purposes of 404 junior colleges in existence in 1929 is reported by Doak S. Campbell as No. 70 of the George Peabody College for Teachers Contributions to Education, Nashville, Tennessee. The evidence was secured from current catalogues, official biennial reports of junior colleges to the secretary of the American Association of Junior Colleges (the investigator himself), the proceedings of five regional standardizing associations, and an extensive canvass of bibliographical materials relating to the junior college.

*Effectiveness of radio instruction in Wisconsin.*—The University of Wisconsin and the Payne Fund of New York City have sponsored a study to determine the effectiveness of radio instruction in supplementing the work done in music and current events in the elementary schools of Dane County, Wisconsin. The committee in charge of the investigation consists of Professors E. B. Gordon, John Guy Fowlkes, and H. L. Ewbank of the University of Wisconsin with the latter as chairman. The sixth, seventh, and eighth grades of thirty schools in Dane County made up an experimental group which had the benefit of radio lessons in dealing with the current events study materials. A like number of schools made up a control group which studied the materials in the usual way and recited to the teacher. The objective examinations show decided advantages resulting from the radio instruction in current events, as well as in music, although the music experiment was conducted on a rather subjective basis.